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Pit and Quarry

With which is consolidated

CEMENT-MILL & QUARRY

February, 1933

Get in Step!

You may not have heard it, but the depression is over—the mental part of it. Men do not talk about it as they did; they no longer congregate in dark corners with hang-dog looks on their faces, predicting the crack of doom. Most of them are done blaming their neighbors, their competitors, everyone but themselves for the spiritual and physical lethargy of the last three years. They have reached the sage conclusion that if they are to be saved from the consequences of their own stupidity, they must do the saving. This change in mental attitude can be counted as at least one real accomplishment of recent months. Certainly nothing half so heartening has occurred since 1929.

Here and there remnants of the old helplessness, the old hopelessness, can still be found. Even at Detroit, where the Highway and Building Congress was expected to attract—and did attract—the most confident and courageous elements of more than a score of industries, there were faint murmurs of complaint. Occasionally a melancholy note was struck, especially when someone tried to start a sensible discussion of means for stopping the robbery of highway funds for public charity, or for calculating a sane basis for planning production even as little as two months in advance. But sanity had the upper hand and promptly stifled the last feeble wail of the "lugubrious blues."

As yet there is no uproar, no gloating in the dispersal of the forces of despair, no feeling of triumph over the backward-looking and backward-wishing conservatives. It is enough to have conquered the spirit of defeatism, the sense of futility, that has shrouded this nation—indeed, half the world—in pessimism and despair, without belittling the tardiness with which some men see and acknowledge the evidences of recovery. Business is definitely on the upgrade, not only "business in general" but business in many industries, in our industries. In some cases this betterment is measured in volume, in others in greater price stability, in others in better collections, in still others in profits or reduction of losses.

These are the gains which everyone has been waiting for and which only the minority of thinking, planning men have been working for. They presage the time when these plans will bear profitable fruit, when the means which they have set up for meeting new conditions will return dividends on their cost, when those who are still waiting will be found still napping.

You who have been pulling back, you who have been insisting that things are no better than they were, you who say you see no reason for confidence, look conditions in the face! No one accuses you of wilfully wanting to keep industry in the doldrums, but many suspect you of stubbornness, of an unwillingness to acknowledge that you are wrong. Recovery is a matter of team-work. The courageous men, who are already making it a reality, can do the job alone, but with your help they can do it more quickly. Why, then, hinder a progressive movement that you can aid; why defer the return of benefits in which you, too, can share? Shake off your foolish misgivings, pick up your confidence where you dropped it three years ago, get in step with the forward-moving elements of industry, and put business on its feet. As we have said before, you can't stand still; either you fall behind or you go ahead.

Pages 19-23

To keep Roebling Rope WORTHY of your *Confidence*

To make certain that in Roebling Wire Rope you always will get the very highest development of rope design and fabrication, Roebling leaves no stone unturned.

1. It maintains one of the country's finest, most completely equipped research laboratories.

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Lima, Ohio

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- ☐ TYPE 106 — 1½ yard capacity.
- ☐ TYPE 302 — ¾ yard capacity.
- ☐ TYPE 404 — 1 yard capacity.
- ☐ TYPE 502 — 1¼ yard capacity.
- ☐ TYPE 601 — 1½ yard capacity.

Remarks:

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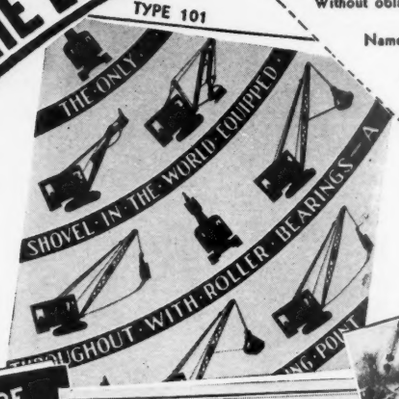
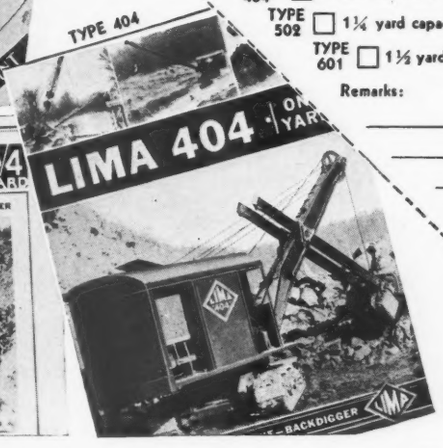
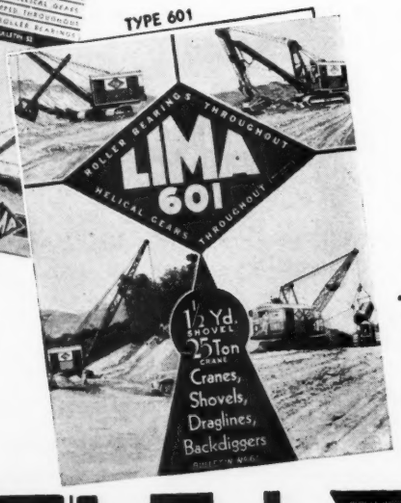
COUPON







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332

SHOVELS
CRANES
DRAGLINES
BACKDIGGERS

LIMA

3-4 YARD
1 YARD
1 1-4 YARD
1 1-2 YARD
CAPACITIES

Pit and Quarry

With which is consolidated
CEMENT-MILL & QUARRY

Volume 25 February, 1933 Number 6

MEMBER AUDIT BUREAU OF CIRCULATIONS

Published on the first of each month for producers and manufacturers of Cement, Crushed Stone, Gypsum, Lime, Sand, Gravel and other non-metallic minerals. Entered as second-class matter November 28, 1932, at the Postoffice at Chicago, Ill., under the Act of March 3, 1879.

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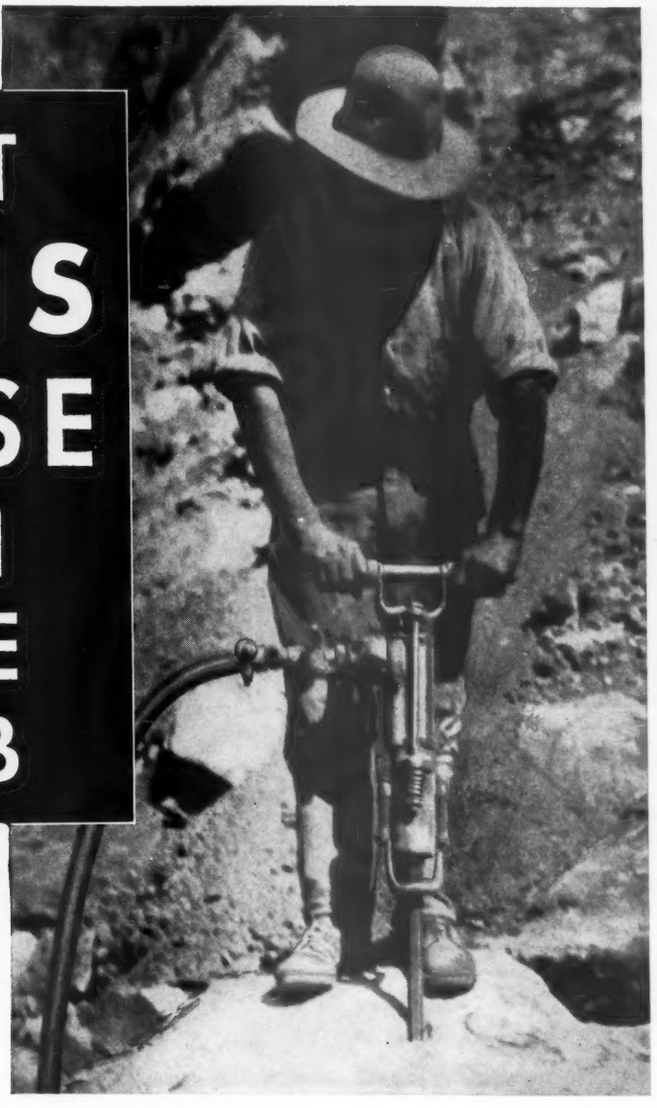
PUT THIS HOSE ON THE JOB



GIVE the stiffest job you've got to Goodyear Emerald Cord Air Hose.

It will stand up to it with an ability and a vitality no other hose can duplicate.

Its stout-hearted body of double-braided Goodyear Cord withstands the pulsating pressures and vibrations.

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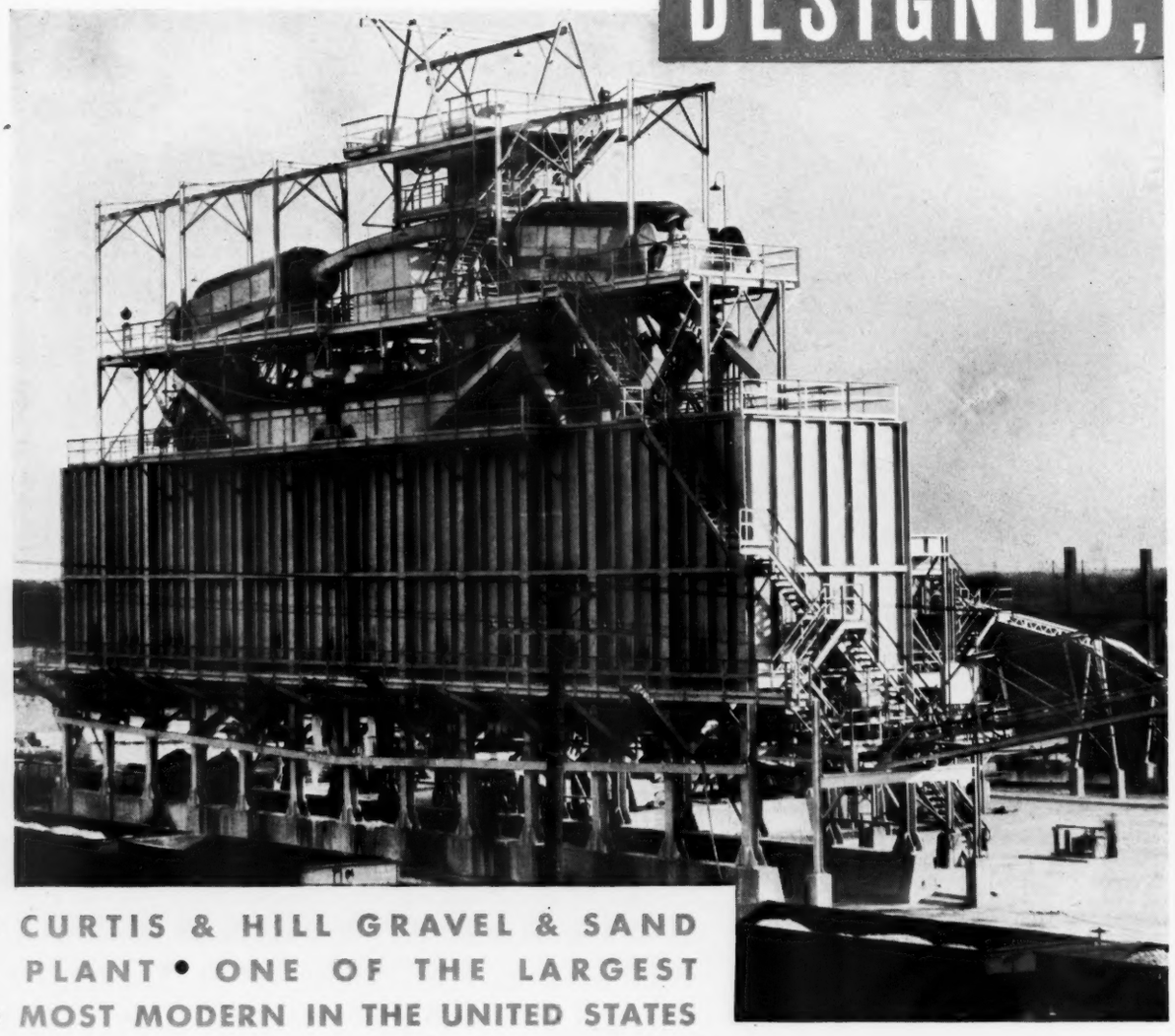


THE CURTIS & HILL GRAVEL & SAND CO. PLANT • ONE OF THE LARGEST AND MOST MODERN IN THE UNITED STATES

WHEN Mr. Curtis planned a new plant for his pit near Morrisville, Pa., he demanded an outfit to operate with the least expenditure for labor, power and upkeep — an outfit with a minimum of mechanical units, but flexible in production and ample in capacity—an outfit to turn out sound, clean aggregate, in the right sizes, on a profitable basis in spite of keen competition. This was the problem that confronted Telsmith Engineers—successfully solved with the layout here illustrated.

The plant is steel and concrete construction, every unit of machinery under push-button control, flood-light equipped for 24-hour day operation, 500 tons per hour capacity. One-half the plant makes material to Pennsylvania specifications, the other to those of New Jersey. Plant may be run either full or half capacity, making material to specifications of either or both states.

A dredge delivers material to the top of the scalping unit where a steel hopper splits the flow into two parts. From this point the plant has duplicate units throughout, with the exception of the coarse crusher and its elevator. Some of the more important units of this plant are pictured on the opposite page.

This Curtis & Hill plant has now been in service for more than a year. Its performance has been highly satisfactory; and it is quite generally regarded by leading gravel producers as one of the outstanding outfits on the Atlantic seaboard, distinguished for (a) economical production (b) quality aggregate and (c) flexibility in production.

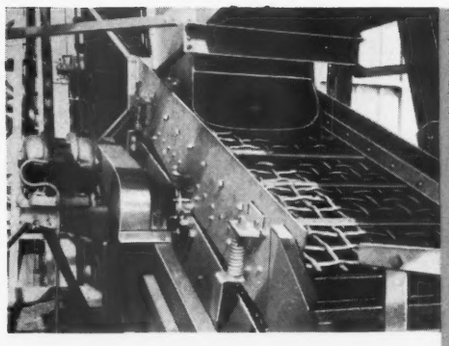
BUILT, EQUIPPED AND BALANCED *by* TELSMITH

1 TELSMITH BALANCED VIBRATOR screens wet or dry materials. Loaded or idling, every inch of screen surface vibrates vigorously and uniformly. The *opposed* movement of the two decks perfectly balances the vibrator action—frame receives practically no vibration. All-steel construction with cylindrical roller bearings, protected against water and grit.

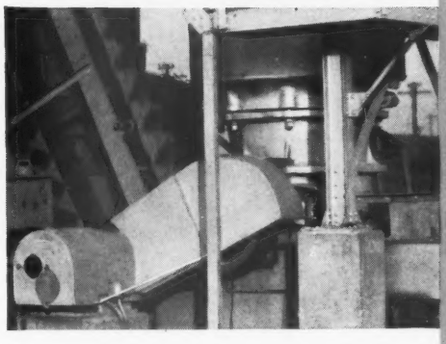
2 TELSMITH PRIMARY BREAKER — short, compact, all-steel structure...cut steel drive gears... larger receiving and crushing areas . . . the famous *parallel pinch* . . . force-feed lubrication—all unite to permit *higher speed* and *greater capacity*. Steel frame, steel crown and rigid bolt-shaft all carry the famous Telsmith Two-Year Guarantee against breakage, even by tramp iron.

3 TELSMITH-HERCULES WASHER thoroughly scrubs the gravel by the ball-mill process. Unlike ordinary washers it has a tandem sand and pea gravel jacket . . . first section eliminates sand, second passes small rock. In the main barrel, the passage of the larger pebbles is retarded by retainer rings and their full grinding action utilized to break up dirt chunks.

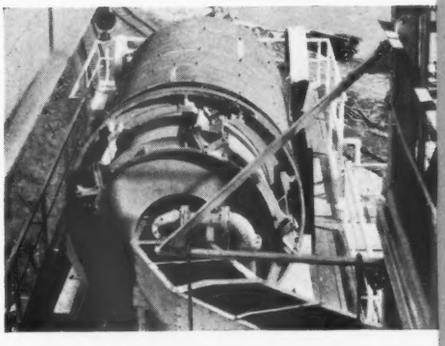
4 TELSMITH SAND DRAG is a complete steel factory-built unit for large scale operations. It effectively handles a great volume of water . . . sand capacity is proportionately large . . . and its scraping action removes dirt adhering to the sand grains. Insures clean aggregate—handles immense capacities—requires little head-room—dewaters so thoroughly that its product may be handled on belt conveyors at 18-degree elevation.



1 Two 4′ x 10′ Telsmith double deck (scalping) vibrators — top decks pass minus 3″; bottom decks pass 1½″.



2 Telsmith No. 13-B Primary Breaker handles plus 3″ rock from scalper screens. Two Telsmith secondary crushers recrush scalper rejects over 1½″ and the oversize returns from the washing screens.



3 Two Telsmith-Hercules Washing Screens, 72″ x 25′, separate sand, scrub and size gravel into three sizes.

4 Six 60″ x 32″ Telsmith Sand Drags (three for each washer) recover bar sand and concrete sand.

WRITE FOR BULLETIN

Whether you contemplate replacing equipment or building a complete new plant, Telsmith Balanced Service selects the most economical method and the right mechanical units for every operation. Write for Bulletin G-15.

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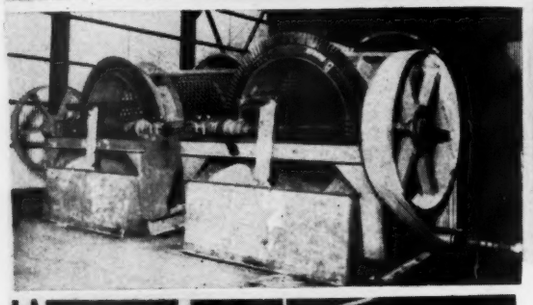
HUDSON RIVER STONE CORPORATION



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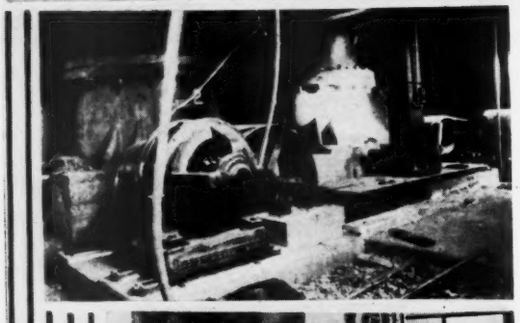

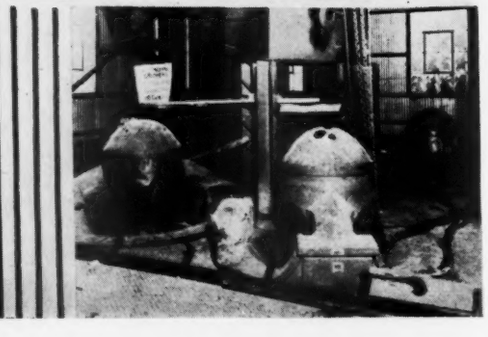

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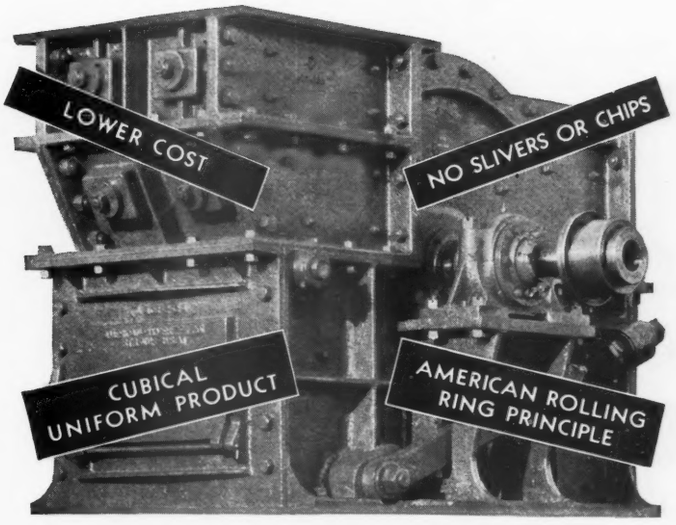

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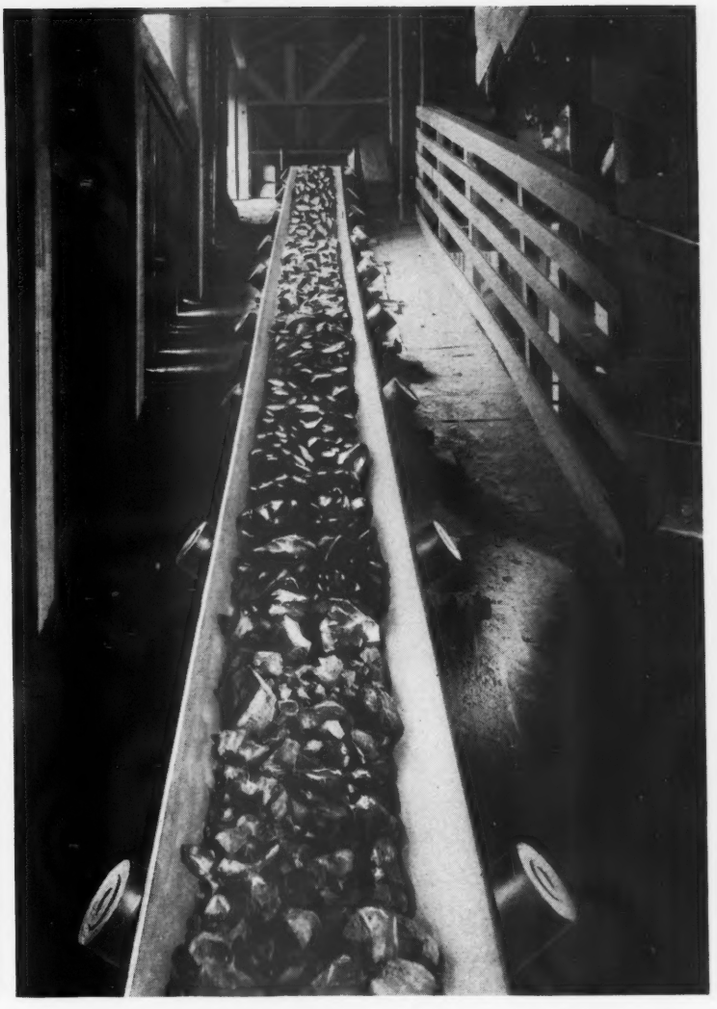
500,000 TONS OF JAGGED ROCK—



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It's true that only a good belt will start its fifth year in excellent condition after handling a half million tons of sharp jagged materials during the first four.

But an Indestructible Conveyor Belt is a good belt . . . and that is the kind of service you can expect it to give you.

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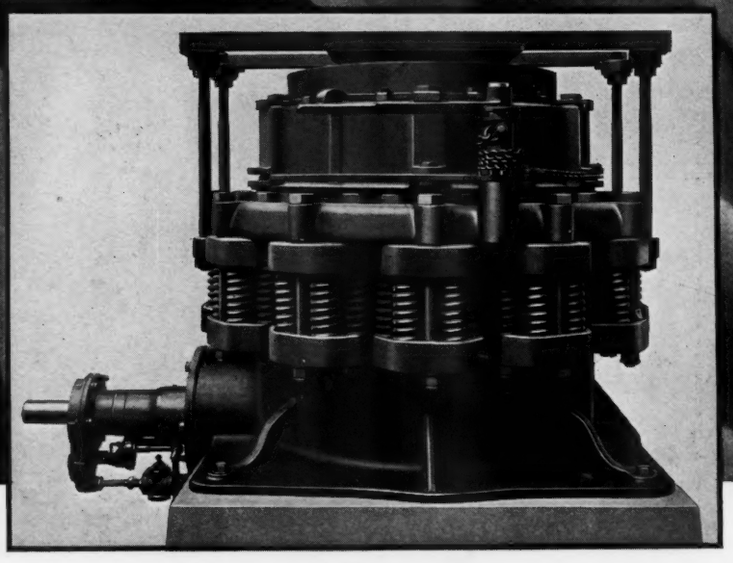

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AMERICAN STEEL & WIRE COMPANY WIRE ROPE

A Watch is Only as Good as its Inner Works

And Wire Rope is only as good as the wires of each strand.

In wire rope manufacture—as in watch making—no end of care must be taken to insure that each part will perform its particular job unfailingly.

Here—then—is a Wire Rope that you may specify for every task that wire rope has to do. Surely—the fact that American Steel & Wire Company Rope outsells all others is proof of performance on the job that saves money and avoids disappointment.

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SIDE DISCHARGE

"Road Builder" Truck Mixers, the modern, low cost paving method for slab work, widening, aprons, shoulders, headers, bridges, curb and gutter, and many commercial concrete jobs. Make road builders your customers.

WITH

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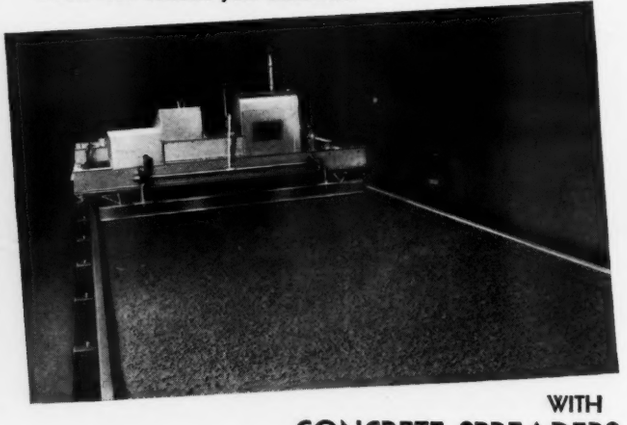

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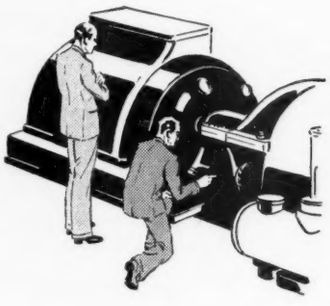

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What they said of the 1932 Edition

▼ ▼ ▼

"A very helpful addition to my technical library." A. L. WORTHEN, *Pres., National Crushed Stone Association, Inc., and Vice-Pres. of Connecticut Quarries Co., New Haven, Conn.*

"We have never yet gone through one of these editions without getting several very good ideas." PHILIP L. CORSON, *G. & W. H. Corson, Plymouth Meeting, Pa.*

"It is the best thing I have seen of this kind." H. B. CAMPBELL, *Gen. Supt. of Mines, Harbison-Walker Refractories Co., Pittsburgh, Pa.*

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It costs money, too, to pass by a firm that is new, and about which you have not yet heard—both in expenses and possible sales. To equipment manufacturers an accurate list of prospects is as indispensable as the motor to a car. To producers, it can mean loss of trade. The savings made by inactivity on list work will not offset the loss of a sale.

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Nazareth, Pa.
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Plant: Nazareth, Pa.
ALPHABETICAL
Nazareth Cement Co. PC
Member of Cement Information Bureau; Cement Institute; Portland Cement Assn.
Plant Executives: henbach (Bethlehem, Pa.) W. F. Kern, chem.; Georg (Easton, Pa.), sec.-tr., p specifies equipment.
GEOGRAPHICAL
Products Annual Capacity: Portland cement 2,000,000 bbl.
Raw Materials Used: Cement rock, gypsum. Stripping: Marion gasoline shovel. Drilling and Blasting: 3 Sanderson-Cyclone drills. Digging and

Pit and Quarry Directory will keep your lists up-to-the-minute. There are more than 5000 changes in the 1933 edition. The Directory is published with the Handbook, and is also reprinted separately for the convenience of travelers. The cost is the same for the complete Handbook or the reprinted Directory. This is the only directory published in the field.

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A new section has been written on "Pre-Mixed Concrete" by H. F. Thomson, V. Pres. Sec., General Materials Company of St. Louis. It will give an up-to-date picture of the industry and detail new methods and procedures.

J. Barab, Manager, Service Division, Hercules Powder Company has written a new section on "Blasting," which will give some important facts and new developments on this subject.

W. D. Keefer of the National Safety Council has written an article on that all-important subject of "Accident Prevention."

A section on "Air Separation," by A. W. Catlin, after submission to various authorities, was pronounced one of the best ever written on this subject.

"The Handling of Pulverulent Materials," by W. E. Trauffer is of value to the cement and ready-mixed-concrete manufacturer, as it lights the way toward cheaper and less wasteful handling of cement.

"Plant-Mixed Road-Surfacing Materials" is an important section on an industry that promises to develop to impressive proportions, and may form a new profitable outlet for aggregates.

Besides the ones above mentioned, there are many other additions and alterations, so that the 1933 Handbook will be not only up-to-the-minute, but will be a distinct step forward in the long line of Pit and Quarry Handbooks.

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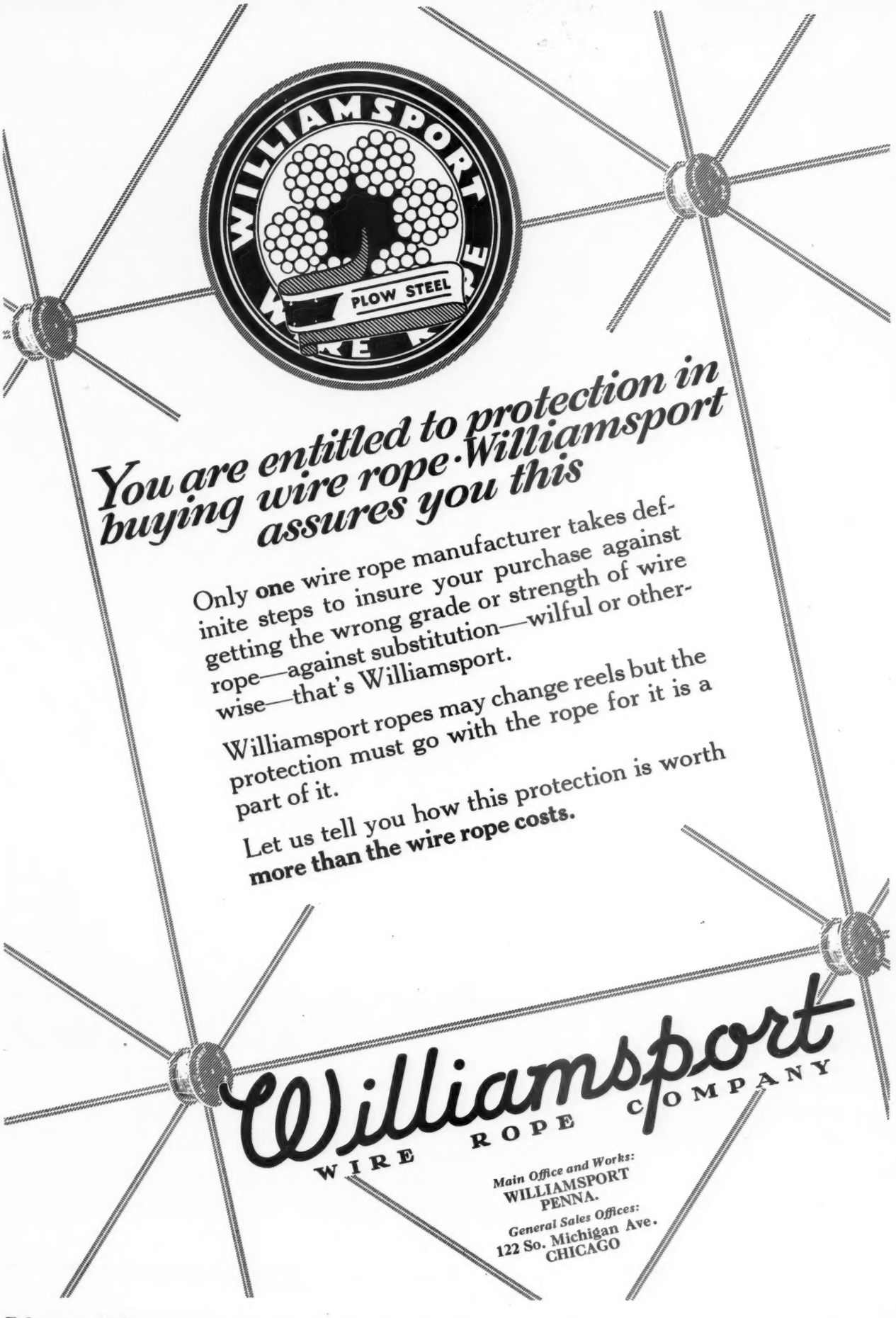

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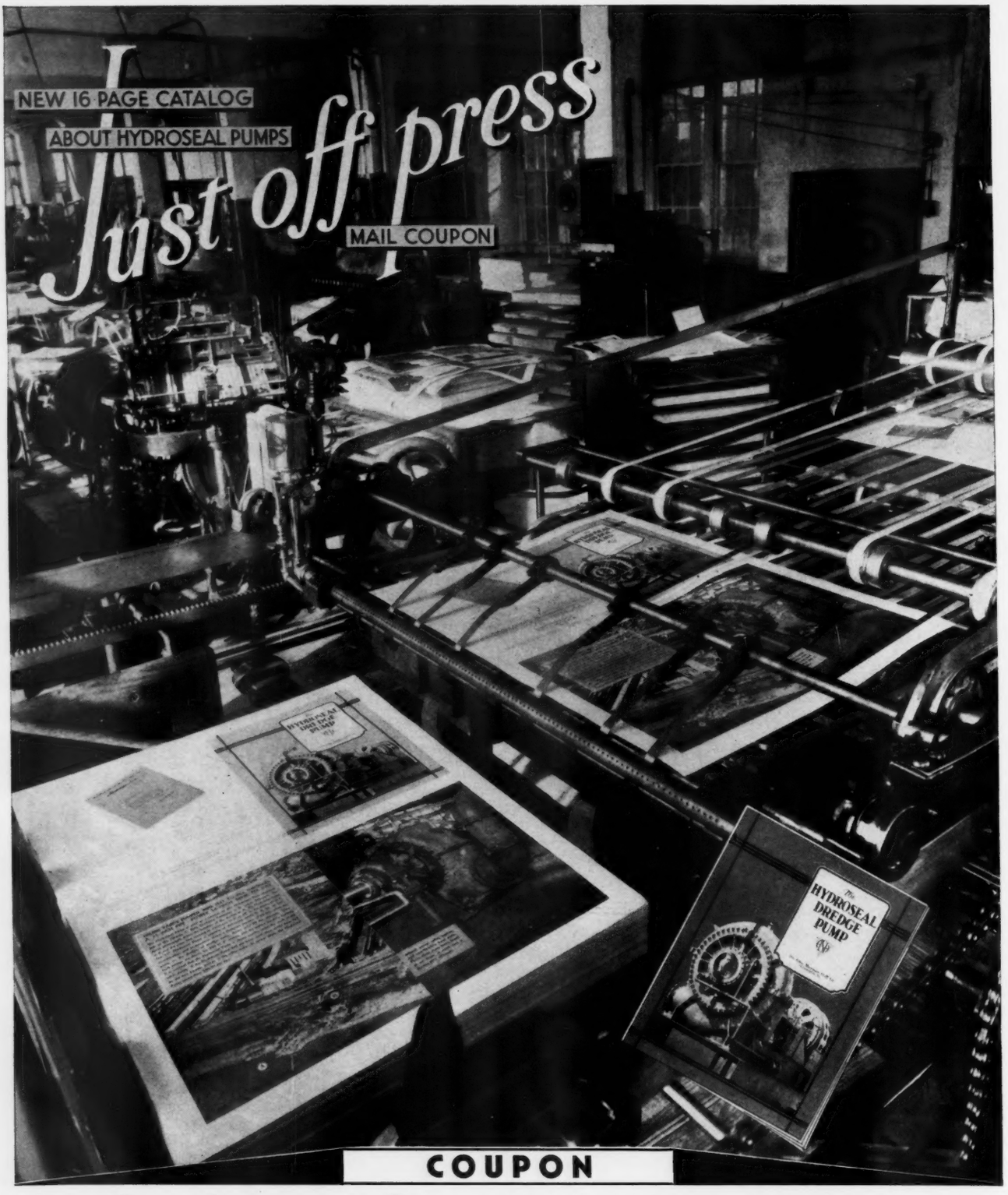

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VOLUME 25 NUMBER 6

Pit and Quarry

With which is consolidated

CEMENT-MILL & QUARRY

CHICAGO, FEBRUARY, 1933

Report Cement Firms Considering Mergers

UNIVERSAL-ATLAS MENTIONED

With the price war among the various cement-producing companies apparently ended, with selling prices stabilized at from 10 to 30 c. per bbl. over the low point reached last year, and with the import menace along the Atlantic seaboard curbed through the threatened anti-dumping penalty, the biggest problem the industry faces at present is the attempt being made in many states and already accomplished in a few others of diverting gasoline-tax receipts and license fees to uses other than road-building. The highway-construction industry is, however, waging a fight against these diversions and, if successful, the lion's share of income from these sources should be devoted to building roads in 1933, keeping cement demands in that important field at about the same level as last year.

An important trend within the industry at present is the talk of consolidation. Merger of four West Coast producers, including Santa Cruz Portland Cement Co., Calaveras Portland Cement Co., Yosemite Portland Cement Co., and Pacific Portland Cement Co., under the banner of the Standard Cement Co. is now awaiting ratification of the stockholders.

It has been widely rumored that Universal Atlas Cement Co., one of the largest individual producers in existence, will be disposed of for the purpose of obtaining funds to allow the uninterrupted payment of preferred dividends by the parent concern, United States Steel Corp. Universal Atlas officials admit the story has come to their attention through the columns of the daily press but deny that such negotiations are pending. It is believed, however, that if steel operations pick up early this year, the steel corporation will keep Universal Atlas under its wing. Should this not be the case, financial experts feel certain that U. S. Steel will get out of the cement business, preferring to strengthen its position in steel. In that event, one of the large eastern producers would probably combine with Universal Atlas, forming by far the strongest combine in the industry.

Negotiations are also said to be in progress looking toward the merger of two other important producers with a combined annual capacity of close to 25,000,000 bbl. annually.

Consolidations such as those mentioned, should they become effective, would undoubtedly cause the abandonment of many obsolete and duplicating plants in various regions, bringing the industry's capacity nearer to the level of normal demand. Last year the plants as a whole operated at only about 29 per cent. of capacity. Even in 1928, when production was at its highest level, only 72 per cent. of the mill capacity was utilized. Although output has declined yearly since then, capacity has actually increased about 16,000,000 bbl.

Award Cement Producers Contracts in Southland

A number of nice orders have been secured recently by cement plants in Birmingham and elsewhere in Alabama. The Southern Cement Co. has been awarded a contract for the post-office and court-house buildings to be erected in Jacksonville, Fla., Alexandria, La., and Beaumont, Tex. The National Cement Co. has also received a contract for 30,000 bbl. of Portland cement for highway work between Tallapoosa, and Bremen, Ga. Shipments will be made from the Ragland, Ala., plant.

The Marquette Cement Mfg. Co. is the recipient of a contract for cement to be used in the construction of Dam No. 3 above Muscle Shoals, Ala., on the Tennessee River.

★ **Meeting Competition by *Beating It!***

Items in these pages marked with a star call attention to those alert producers who are awake to the arrival of an era of good business and who are expressing their faith in the future by buying and installing their needed equipment NOW.

Indiana Road Makers Gather at Purdue U.

EXCHANGE IDEAS ON PROBLEMS

Various phases of highway problems were expounded by prominent authorities at the nineteenth annual road school and exposition of equipment held at Purdue University, Lafayette, Ind., January 23 to 27. Nearly all Indiana county surveyors and county highway superintendents attended the gathering, while many road builders and material producers in the Hoosier state were present at the sessions.

The affair is sponsored each year by the university, with the Indiana Highway Commission, Indiana County Highway Superintendents' Assn. and the Highway Materials and Equipment Assn. of Indiana coöperating.

Principal speakers during the five-day meeting included W. M. Holland, executive secretary, Indiana Highway Constructors, Inc.; H. F. Clemmer, engineer of materials, District of Columbia; Ben H. Petty, professor of highway engineering, Purdue University; S. C. Hollister, professor of structural engineering, Purdue University; Frank T. Sheets, chief engineer, Illinois State Highway Department; and Alonzo J. Hammond, president, American Society of Civil Engineers.

Technical topics discussed included: new paving materials, methods of bituminous surface treatment, fundamentals of bridge design, an analysis of highway-financing methods, and winter construction problems.

At the annual banquet held Thursday evening, January 26, the road men were honored by the presence of Dr. E. C. Elliott, president of Purdue University, who served as toastmaster.

Starts Development of Tennessee Silica Land

★ Loading facilities and storage bins are to be erected near Waynesboro, Tenn., shortly by the Central Silica Corp., of Birmingham, Ala., on properties recently acquired there. The concern early this year took out a charter in Tennessee and, according to reports, will develop its new silica deposits extensively.

Stone Producers Win Victory in Congress

DENY SECTIONAL LIMITATION

After a protracted debate, which included an allegation by Representative Fiorello H. LaGuardia (Rep.), New York, that the Indiana Limestone Co. has a monopoly on furnishing stone for federal-government building projects, the House recently refused to accept a limitation on the Treasury Department appropriation bill for the fiscal year 1934 restricting the use of building stone on federal projects to products of the section in which the building is being done.

The amendment was offered by Representative William P. Connery (Dem.), Massachusetts, and read as follows:

"Provided further, that no part of the moneys appropriated in this act shall be used to pay contractors for public buildings to be erected or remodeled where the stone is specified to be quarried outside the section where such public building is to be erected or remodeled."

Chairman Joseph W. Byrnes, of the House appropriation committee, made a point of order against the amendment on the ground that it constituted legislation on an appropriation bill and changed existing law. After considerable discussion on the point of order, Representative Thomas S. McMillan (Dem.), South Carolina, who was presiding, overruled it.

Mr. McMillan held the amendment to be a restriction on the use of money provided in the bill, and a proper limitation.

The amendment, however, was finally defeated by a vote of 58 to 41.

In making his attack on the Indiana Limestone Co., Representative LaGuardia declared he spoke with authority. He said he had encountered the same situation while serving as president of the board of aldermen of New York City. He said there was no particular criticism of Indiana limestone, but the amendment was necessary by reason of the practices of the Treasury Department in giving Indiana limestone an advantage over every other stone in the country.

"That is all there is to it," he said, "and I will limit it even more than that. Not only have the practices in the Treasury Department given the advantage to Indiana limestone, but they have given the advantage to the Indiana Limestone Co. to the disadvantage of other companies in that state, and I make this statement without a reservation at all, because I know the facts."

He said all the amendment sought was to have the Treasury Department's specifications drawn so as to permit other than Indiana limestone companies to bid.

The amendment was opposed and Indiana limestone and the practices in vogue in the Treasury defended by members of the Indiana delegation, as well as members from other states.

Representative David Hogg (Rep.), Indiana, opposing the amendment, declared "it would be a fine thing, indeed, if all building materials could be purchased in the community where they are to be used. But," he continued, "we are a nation, and each part of the country has a right to contribute its part to the buildings of the entire country. No one has yet shown that there have been shortcomings or unnecessary expenditures in the letting or execution of any contract wherein Indiana limestone has been used. If there had been, the law prescribes a proper method of relief.

"If the Indiana limestone is not entitled to be used in every instance where it has been selected, then the office of the Comptroller General of the United States can and will hear anyone who has an objection to make. The fact that no objection has even been made to the comptroller general, much less substantiated, proves how unfounded are the rumors which we sometimes hear."

Representative Thomas L. Blanton (Dem.), Texas, supporting the amendment, asserted the Treasury Department "has a way" of preventing Texas quarries from furnishing stone even for federal projects in that state. "The Treasury Department ought to see to it that every quarry that can produce the kind of stone that ought to be used in our buildings has a right to put its bid in, and have it considered," Mr. Blanton said. "That is the reason I am in favor of the amendment offered by our friend from Massachusetts."

Taking the floor to support his amendment Congressman Connery said "we have had much trouble on this matter." He said the specifications many times call for a color of stone which can not be furnished by local quarries, hence they can not bid.

"Evidently the idea is that some concern which has had a monopoly on this is to be taken care of by these specifications," he said. "I am sure the members will all agree that we want to be fair to every part of the country. There are quarries all over the United States, and I think it is only fair and reasonable that the men who work in those quarries and the

(*Continued on page 22*)

Quarry Superintendent Resigns; to Sell Cement

Joseph H. Kratz, quarry superintendent at the operations conducted by Walker Bros., at Shippensburg, Pa., has resigned and plans to enter the sales department of a cement company in the Lehigh Valley region. Mr. Kratz had been in charge of the operations at Shippensburg for many years, the quarry and plant having been operated until last year by J. C. Showalter & Co.

Norman Kauffman has been named his successor.

H. L. Block Cheerful on Cement Prospects

EARLY RECOVERY IS EXPECTED

The cement industry was one of the last to be seriously affected by the general slump in business and industry, but is apparently going to be one of the first to recover, in the opinion of H. L. Block, president of the Missouri Portland Cement Co., who was recently interviewed by the St. Louis *Globe-Democrat*.

Mr. Block cited the recent increase and apparent stabilization of cement prices, and the successful reorganization and refinancing of the Portland Cement Assn., in making his prediction.

"At this time architects and construction engineers are giving more thought to fireproof homes," Mr. Block declared. "Unquestionably the homes of the future are going to require much more Portland cement in their construction than those built during the decade just past. The increase in the use of cement in this field alone has astounding possibilities.

"The farm market for cement has been more or less dormant in recent years as a result of the low level of farm-commodity prices, but as farm prices return to a satisfactory level, the farmers will require large amounts of cement for improvements and maintenance which, by necessity, have been rather neglected in the past year or two."

Mr. Block estimates that, with the return of farm prices which will yield the grower a profit, the use of cement on American farms will reach a total of 30,000,000 to 40,000,000 bbl. annually.

Arkansas Gravel Plant Installs New Equipment

★ New equipment is being installed at the plant of the Minden Gravel Co., near Delight, Ark., preparatory to resuming production early this spring. Other machinery is being repaired.

Orders already on hand will insure operation for at least three months, according to "Tot" Drew, who is directing the repair work and who will superintend operations when work gets under way.

Nebraska Quarry Given Huge Rip-Rap Contract

Approximately 1,000 carloads of rip-rap will be supplied by Cass County Quarries at Nehawka, Neb., for improvement work on the Missouri River, according to Ole Olson, superintendent.

Contract for supplying the stone was awarded the Nebraska concern recently by the Kansas City Bridge Co., who have the general contract for the work.

Sales of Sand, Gravel Decline 22 Per Cent.

1931 FIGURES JUST RELEASED

The total output of sand and gravel reported as sold or used by producers in the United States in 1931 amounted to 153,479,044 short tons, valued at $86,280,320, a decrease of 22 per cent. in quantity and 25 per cent. in value as compared with 1930, according to figures released in January by the U. S. Bureau of Mines. Production was reported for approximately 2,650 plants and pits in 1931 as compared with 2,700 in 1930. There were decreases in all classes of sand-and-gravel materials except sand used for miscellaneous purposes such as fills, bank-widening, etc.

The total output of sand in 1931 amounted to 64,492,826 short tons, valued at $36,696,746, a decrease of 23 per cent. in quantity and 26 per cent. in value as compared with 1930.

The total output of gravel amounted to 88,986,218 short tons, valued at $49,583,574, a decrease of 22 per cent. in quantity and 24 per cent. in value from 1930.

Eleven states each reported the production of over 5,000,000 tons of sand and gravel in 1931 as compared with fourteen states in 1930. New York, Illinois and Indiana were the largest producers of these materials in 1931, New York reporting 17,155,174 short tons, Illinois 10,297,943 tons and Indiana 10,091,450 tons. California, Ohio, Pennsylvania, Michigan, Texas, Wisconsin, Massachusetts and Louisiana followed in order among those exceeding 5,000,000 tons each. The states leading in total value of output were New York, with $10,612,014, Pennsylvania, $6,977,246 and California, $6,222,779.

The total washed and screened or otherwise prepared sand and gravel sold or used by producers in 1931 amounted to 120,647,222 short tons, valued at $75,023,189 or 79 per cent. of the total sand and gravel produced.

Detailed tables covering figures on production for each state, by uses, appear in PIT AND QUARRY HANDBOOK AND DIRECTORY for 1933, which is just off the press.

A. E. Dickinson to Head Indiana Limestone Corp.

A. E. Dickinson, president of the now defunct Indiana Limestone Co., also will be president of the Indiana Limestone Corp., new organization formed as successor to the limestone company.

The officers also include W. E. Clark, Bedford, now attorney for the company, vice-president; E. N. Welsh, Bedford, now assistant treasurer, treasurer; Thomas H. Jones, Cleveland, secretary; L. P. Corey, Bedford, controller, and William R. Martin, Bedford, assistant secretary and assistant treasurer. Mr. Jones had no previous official connection with the company, while Messrs. Corey and Martin are being retained in their present positions.

Under the reorganization plan fixed charges of the company will be drastically scaled down.

Bondholders Committee Formed to Guard Rights

Holders of the first mortgage 6-per cent. bonds of Consumers Rock & Gravel Co., Inc., Los Angeles, Cal., have been informed that the bonds are in default and that a bondholders protective committee has been formed to protect their interests. Total charges unpaid on January 3 of this year were $45,000. The total outstanding issue on March 1 last was $1,166,000. In addition, Union Rock & Gravel Co., which was consolidated with the concern and the Reliance Rock Co. to form the Consolidated Rock Products Co. had a total of $2,008,000 of 6-per cent. first mortgage obligations outstanding. The company has its principal plants in Southern California and in the San Joaquin Valley.

$1,900,000,000 Spent on Highways During 1932

Expenditures on highways and city streets in the United States during 1932 totaled about $1,900,000,000, representing a decline of about $300,000,000 from expenditures of $2,200,000,000 in 1931.

The network of highways now totals 3,055,000 mi. compared with 3,009,000 at the end of 1931. Of the total road mileage, surfaced roads exceed 750,000 mi., or about three times as extensive as Class 1 rail mileage. At the end of 1931, 730,000 mi. of roadway had been surfaced.

Motor-vehicle users paid $1,085,000,000 in taxes last year, an increase of about $60,000,000 over 1931 and representing a new high record. Tax payments by car owners accounted for 12 per cent. of total Federal, state and local tax receipts.

Glens Falls Cement Co. Expands Selling Force

Appointment of Thomas R. Donnelly as assistant sales manager of the Glens Falls Portland Cement Co., Glens Falls, N. Y., has been announced by George F. Bayle, Sr., president. The position is a newly-created one, opened in connection with an increase in the sales force of the company.

Mr. Donnelly has been associated with the company as a salesman for several years, covering the Albany district and territory extending to Scranton, Pa. Through his long experience in the business, he has become thoroughly familiar with its practices and problems.

Nonmetallics Retain Big Lead in California

1932 STATISTICS SHOW VALUES

Nonmetallic minerals continue to hold their position in California, according to the preliminary report for the year 1932 just issued by the California Division of Mines. The total mineral production for the year, exclusive of fuels, was valued at $44,765,000. Of this total, $28,266,000 represents the value of nonmetallic minerals, with crushed stone, sand and gravel leading the list, and $12,299,000 representing the value of metallic minerals produced during the year. Gold, because of the large increase in small placer-mining operations due to the unemployment situation, was the only mineral to show an increase in the value of production for the year.

Estimated values of nonmetallic minerals were as follows: Crushed stone, sand and gravel, $9,500,000; Portland cement, $7,808,000; salines, including borates, potash, salt, soda, etc., $8,000,000; brick and building tile, $1,800,000; magnesite, $158,000; other structural materials, including granite, lime, marble, etc., $1,000,000.

Metal values were: Gold, $11,700,000; silver, $141,000; copper, $67,000; lead, $61,000; quicksilver, $325,000; other metals, $5,000.

Miscellaneous industrial minerals, including both metals and non-metals, not included above were estimated to have been worth $4,200,000.

Black Granite Deposit Opened in Nova Scotia

★ An important deposit of black granite has been uncovered near Loch Katrine on the border line between Antigonish and Guysborough Counties, Nova Scotia, according to information received by the natural resources department of the Canadian National Railways. The deposit covers a wide area and the stone is of good quality. As black granite has always been imported into Canada from Sweden it is believed that there will be a large and ready market for the local product for the marketing of which plans are now being made by a Nova Scotia syndicate.

Orders Aggregates Be Sold on Weight Basis

An ordinance requiring that all sand, gravel and crushed stone used in Sacramento, Cal., for construction purposes be sold and delivered by weight instead of by volume has been adopted by the Sacramento city council.

The measure was enacted to simplify judging of bids for aggregates and to set up a standard, it was said.

MacNider Reëlected Head N. W. States Co.

CONCERN IN EXCELLENT SHAPE

The Northwestern States Portland Cement Co. is in the best financial condition in its history, Col. Hanford MacNider, president and general manager, declared at the annual meeting of the corporation held recently at Mason City, Ia.

"Although there has been a considerable drop in shipments during the past year the company has managed to maintain operations on a solid basis, with the result that there has been a considerable saving over the year before, placing the company in a stronger position than ever," he declared.

Col. MacNider was reëlected president and general manager at the meeting of directors that followed the stockholders' session. F. J. Hanlon was chosen vice-president and Willis G. C. Bagley, treasurer. B. A. MacDonald was named assistant to the president and general manager; Peter Anderson, secretary, and Clarence A. Hanson, assistant secretary.

At the stockholders' meeting the 11 directors of the company were relected, including Col. MacNider, Mr. Hanlon and Mr. Bagley. The directorate includes William Chamberlain, Mason City; William Stern, Fargo, N. D.; Fred Keeler, Los Angeles; E. C. Frudden, Dubuque, Ia.; M. T. Gunderson, Kenyon, Ia.; S. T. McNight, Minneapolis; Edwin White, St. Paul, and S. L. Wright, Winona, Minn.

Congress (*From page 20*)

men who own those quarries in that section of the country should be taken care of when public buildings are erected in their localities."

Some of Representative Connery's colleagues called his attention to the Boston post-office controversy of several years ago. At that time the Treasury Department specified Indiana limestone for the building. Massachusetts members of Congress fought to have the specifications changed to permit the use of Massachusetts granite. According to Representative John C. Ketcham (Rep.), Michigan, Congress refused to intervene and the result was a saving to the government of $750,000.

Representative Eugene B. Crowe (Dem.), Indiana, opposed the Connery amendment, declaring that "Indiana limestone as a building material stands in a class by itself for durability, beauty, strength, and economy, and is to be had in such large quantities that it can be furnished with hurried dispatch on the largest jobs."

He said if limestone were used more extensively than it is at present it would result in an enormous saving to the federal treasury. In almost every instance, he said, limestone can be furnished cheaper than other material.

"There is no monopoly of Indiana limestone," Mr. Crowe said. "Nature has filled the hills of several southern Indiana counties with hundreds of millions of cubic feet of this outstanding building stone. Strong companies, many of them, by good business ethics, have put the limestone industry of Indiana on a strong and solid footing, thereby competing in the open market in private industry all over the United States. These companies should have the same opportunity to compete on government jobs in any part of our nation and not be hampered by unwise, unfair legislation."

Representative Ralph F. Lozier (Dem.), Missouri, asserted the purpose of the amendment was to "curb the power of the building-stone monopoly now enjoyed by a certain Indiana limestone quarry and to permit quarries in other sections to compete for public buildings in their respective localities. Under the present system," Mr. Lozier said, "no matter where a federal building is being constructed, this Indiana corporation generally furnishes the material, although there may be just as good building stone available close to the community where the building is being constructed."

The venerable Representative Will R. Wood (Rep.), Indiana, ranking minority member of the House appropriation committee, and for many years its chairman, opposed the amendment principally on the ground that it would destroy the whole building program and increase the cost of public-building construction.

Marquette Is Acquiring Fleet of Steel Barges

★ The Marquette Cement Manufacturing Co., it is reported, is acquiring a fleet of steel barges now in use on Ohio River to be used in transferring coal from Grand Tower, Mo., on the Mississippi to the company's plant at Cape Girardeau, Mo.

The report indicates that the towboat *William Dickinson* used during the past two seasons in Illinois River cement trade, operating from the river-rail terminal at Peru, Ill., will handle this coal fleet during the winter, and spring.

Riverside Cement Had 1932 Net of $277,958

Based on the preliminary report of its auditors, Riverside Cement Co. for the year 1932 showed net profits of $277,958.82 after all charges and Federal taxes, equal to $4.82 a share on 57,567 shares of $6 cumulative preferred stock as against $401,372.53, or $6.47 a share on 59,574 preferred shares in 1931, according to figures released by John Treanor, president.

Dividends of $322,104 were paid during 1932 on the preferred stock. Volume of sales declined approximately 20 per cent. from the low volume of 1931, and operations were conducted at a rate less than 25 per cent. of the company's producing capacity.

The company has been successful in its efforts to produce a cement of low heat in hardening for use in massive structures without sacrificing any of the valuable properties of normal Portland cement. The company has already furnished 75,000 bbl. of this cement for the tunnel linings at Hoover Dam and more than 100,000 bbl. for the building of the Pine Canyon Dam of the city of Pasadena. Applications for patents to protect the company in this discovery have been made.

Dixie Mining Co. Begins Work on Slate Deposits

★ Slate is already being produced on the properties recently acquired at Chilhowee, Tenn., by the Dixie Mining Co. and the company plans to develop the property on a much larger scale some time during the present year.

Officials of the concern include J. P. Morgan, W. H. Thomas, T. L. Lewis, W. E. Thomas, and J. F. Edwards.

St. Louis Quarrymen in Opposition to Rate Rise

A proposed arbitrary increase in compensation-insurance rates in the state of Missouri is being strenuously opposed by industrial concerns throughout the state. The St. Louis Quarrymen's Assn., through its executive secretary, E. J. McMahon, presented a brief recently at a public hearing on the proposal held before the state superintendent of insurance at Jefferson City.

Mr. McMahon contended that the accident-frequency and severity rate in the quarrying industry had declined sharply in recent years and that the 25-per cent. increase asked for is not justified. He supported his claim by tabular material and charts.

Resume Cement-Making After Disastrous Flood

Activity at the Monolith Portland Cement Co. plant at Monolith, Cal., brought to a temporary halt some time ago by the disastrous Tehachapi flood, has been resumed with the firing of three kilns and the enlargement of a fourth to produce special grades of cement.

For weeks crews of men have been engaged in cleaning up debris and in repairing damage which resulted when flood waters partly inundated the plant. With this work completed,

the wheels of production have again started turning.

Shipments were continued even while the plant was shut down, the first carload having gone out 36 hours after the flood. A large volume of cement was shipped from Monolith by truck and rail even while the plant itself was inactive.

Alabama Gravel Concern Bought by Bondholders

The Roquemore Gravel Co. of Montgomery, Ala., was purchased for $50,000 by the Citizens & Southern Co. of Savannah, Ga., at a public sale held at Montgomery recently. The purchasing company was organized by bondholders as receivership proceedings had been filed in federal court by the bondholders who claimed an equity of $200,000.

Operations are expected to be resumed by the new owners in the near future. The company owns considerable land in Alabama and Georgia.

California Leads Again in Construction Activity

★ Building permit figures in 533 cities and towns of the United States during December, 1932, amounted to $26,218,996, according to official reports made to S. W. Straus & Co. This figure represents a 20.08 per cent. decrease from November, 1932, when the volume for these cities was $32,338,936. Permits issued during December, 1932, fell 50.05 per cent. below the same month of 1931.

For the second successive month California topped New York in state figures. Six California cities are among the first 25.

Will Furnish Stone for Minneapolis Post-Office

The Breen Stone & Marble Co. of Kasota, Minn., has been awarded a contract for supplying Kasota stone for the new post-office building at Minneapolis, construction of which is already under way.

Prospects Appear Good for Steady Production

Prospects are bright for steady operation through 1933 of the Oakdale, Cal., plant of Atlas Rock Co., according to R. L. Robinson, plant manager.

Several contracts for material, signed recently, give assurance that production will be maintained at a fairly constant and profitable level.

Alpha to Resume Plant Operations in Alabama

The Alpha Portland Cement Co. will return approximately 70 men to work at its Birmingham, Ala., plant by the middle of February in order to fill orders for 100,000 bbl. of cement for highway construction in Mississippi. Production will be at about 50 per cent. capacity at the plant which has been closed since December first.

The company also has other contracts for construction work in Mississippi and Florida.

Dillard Succeeds Sturm as Head of Gravel Firm

Sturm & Dillard Co., producer of sand and gravel, with plants at Circleville, O., and Syracuse, Ind., has cancelled its West Virginia charter and has incorporated under the laws of Ohio.

John L. Dillard of Winston-Salem, N. C., has been elected president of the company, succeeding Lloyd E. Sturm, who died at his home in Columbus, O., recently. Mr. Dillard was formerly vice-president.

Oklahoma Takes Bids on $1,000,000 Road Program

Oklahoma will resume its program of major highway construction this year following the announcement of the state highway commission asking for bids which, it is said, will total approximately $1,000,000. The big letting marks the end of the 10-months' controversy over federal aid in that state.

Consider Stone Co. Site for New Convention Hall

A site owned by the Buffalo Crushed Stone Co., in the University district of Buffalo, N. Y., is being considered by the city's planning commission on which to erect Buffalo's proposed new convention hall and stadium.

Lamb Chosen President of Ohio Gravel Concern

R. M. Lamb was elected president of the Mount Vernon Sand & Gravel Co., of Mount Vernon, O., at the annual meeting of the company recently. Fred W. Kahrl was named secretary-treasurer. Members of the board of directors for 1933, in addition to Messrs. Lamb and Kahrl, include Milton S. Lewis, Ralph Walker and Walter Sperry.

S. C. Hadden Resigns as Traffic Assn. Secretary

Samuel C. Hadden, secretary of the Indiana Sand and Gravel Assn., with offices at Indianapolis, Ind., has resigned his position as secretary of the Indiana Motor Traffic Assn., to enable him to devote his entire time to handling the affairs of the Indiana gravel producers.

Modern Rock Asphalt Plant Rises in N. M.

BIG INVESTMENT IN PROJECT

★ Production of rock asphalt is under way on an extensive scale at the new and modern plant and quarries of the Santa Rosa Rock Asphalt Co., located eight miles from Santa Rosa, N. M. Large quantities of material have been contracted for by the state of New Mexico and in the Panhandle area of Texas, the material being prepared and especially adapted for road building.

Hundreds of thousands of dollars were spent on the new plant and in erecting and equipping a Diesel-driven power plant. A complete plant laboratory has been installed and is functioning.

Three years of diamond drilling were undertaken before operations were started, according to A. R. Hebenstreit, of Albuquerque, N. M., president of the concern. The deposit consists largely of impregnated sandstone, although some asphaltic limestone has been processed from the same deposit.

Mr. Hebenstreit believes that the material will find a wide use in the southwest where the need for improved roads which require little maintenance has long been felt. "Our confidence in the product is unlimited," Mr. Hebenstreit declares, "because we believe we have the answer to the road situation in this vicinity. Santa Rosa rock asphalt provides a higher type of road than the common oiled type at very little extra cost."

Santa Rosa, near which the plant is located, is about 90 miles directly east from Albuquerque.

Salt Field Discovered in South Saskatchewan

★ Preparations are now being made for the manufacture of salt on a large scale at Simpson, Saskatchewan, according to information received by the natural resources department of the Canadian National Railways. A salt field, capable of producing 10 tons per day was uncovered recently at 3,445 ft. by a company that was drilling for oil. Already thirty tons of salt have been produced from this well by a small demonstration plant. Pumping difficulty was experienced at first but this has been overcome and a company has been formed to proceed with the manufacture of the product.

The mill of the Fluck Stone Co., in Chicago, has been sold by A. J. and H. W. Fluck, stone operators of Bloomington, Ind., to a brewery company in Chicago.

The plant of the Industrial Silica Corp., at Dundee, O., resumed operations recently. Nearly 100 men were put back to work.

Editorial

Page Mr. Homo Sapiens!

ONE hears much caustic comment these days on the vaunted intelligence of man. The more cynical members of the populace, somewhat disillusioned by the recurring disappointments of recent years, point with scorn at the material accomplishments of mankind—what they contemptuously refer to as the "labor-saving" devices of our modern civilization—and then discourse sarcastically on its lack of social attainments. There is plenty of bitter denunciation of the cleverness that, directed to selfish ends, has won commercial success and renown for itself, yet, either through lack of interest or lack of ability, has utterly failed to prevent, alleviate or remove the distress that has come along with—or, say they, as the result of—that very type of skill. The attempts that have been made to answer these and similar criticisms have not been eminently successful, largely because those who have essayed to reply have been chiefly persons whose intelligence and experience do not make much of a show when applied to social problems and not because, as the cynics contend, there is no satisfactory answer.

Although we do not place as low an estimate on the intellectual powers of man as the cynics have adopted, we do believe that these powers have been overrated. The reasons for this lie somewhat far behind us in point of time, too far, perhaps, to be generally perceived. When Linnaeus' passion for systematic arrangement led him to place man at the top of his *Systema Naturae* and to designate him as *Homo sapiens*, he doubtless never suspected that the position and title of nobility which he so readily conferred on his fellow man would some day be considered, if not inappropriate, at least of questionable validity. Although he placed the chimpanzee with, but below, man, the striking similarities between the two did not blind him to the necessity of separating what Milton had called "a reasonable creature, God's image," from the black ape of Africa. It pleased him, and certainly must have flattered his contemporaries, to believe that the possession of sageness, wisdom, profound knowledge, was at least one of the qualities that distinguished man from the beast of the jungle. Since that time mankind has been busying and wearying itself trying to live up to the name he gave it, and now, in this period of man's greatest scientific attainments, the justness of the appellation is being challenged. Yet even the challengers find it difficult to relinquish one iota of the many claims to intellectual supremity which man has accumulated through centuries of self-applause.

Criticism is part of the temper of the times. One can not look about him and see apparent failure on every hand without questioning the sagacity of those to whose credit or discredit existing conditions are attributed. One can scarcely believe that in a world of material plenty millions of people should lack the food needed to sustain life or the modicum of physical comforts necessary to preserve contentment. It is difficult to realize that hundreds of millions of people continue to long for the things they have always wanted, that these desires grow from day to day, that they are willing to work as hard and as long as they have worked in the past in order to gratify these cravings, and yet that the opportunity for work does not exist in sufficient measure. There is an element of strangeness in a situation which discloses countless millions of acres of wealth-bearing land, waiting to be relieved of its life-sustaining and comfort-providing resources, and nearly as many millions of people needing that wealth and willing to work for it, and which affords no means of uniting these naturally related, but for the moment seemingly incongruous, conditions. The lack of profit-making opportunity on the part of the owners of these lands prevents the employment of these people for money wages, while the very fact that these resources are privately owned prevents their being developed and made available even by people willing to work merely for payment in the products of their labor. An age which has discovered how to utilize the earth's great resources has failed utterly in devising means for making those resources available to those willing to work for them. Truly, we may be geniuses in matters of mechanics, but we are bunglers in things social.

WE have devised a myriad of mechanical playthings with which we amuse ourselves in childhood and maturity; we have erected huge industrial and financial structures to surround these toys with an atmosphere of life-and-death importance; we have slipped into a way of living that makes the operation of these contrivances seem to be the be-all and the end-all of man's existence. We have become a race of wonder-conceiving and wonder-working inventors, handling our tools with an astonishing proficiency and designing new ones with a facility and an ingenuity that, applied in socially more important forms of activity, might easily revolutionize, elevate and beautify our daily lives.

No one can disprove the greatness of this achievement, even though it has touched only the mechanical phases of our existence and even though the evidences of this accomplishment are limited to the realm of the physical sciences. It demonstrates at once the fertility of the human mind, the wide range of its capacity, and the continuous and arduous labor of which it is capable, when sufficiently pushed. Nor can anyone seriously question the magnitude of the task or the success with which it

has been performed, even though it was done without a plan, without a coördination of effort, without even a central idea. The absence of a definite purpose need not lessen the wonder of it all, although it may detract from the credit which man would like to give himself for having accomplished it. The fact remains that we have developed the mechanical side of our civilization and neglected the social side, not realizing that the ultimate success of the mechanical phases of our growth is dependent upon an intelligently-guided development of the social side. We have learned how to make things cheaply (even if not how to make them good); we have become adept in utilizing our resources of men and materials so as to attain the greatest financial profit; we have learned how to enlist the hearty support of the populace for the maintenance of our huge industrial system. We have learned how to produce what we need with fewer and fewer workers, but we have not discovered, or tried to discover, how to keep the ones displaced off the charity lists.

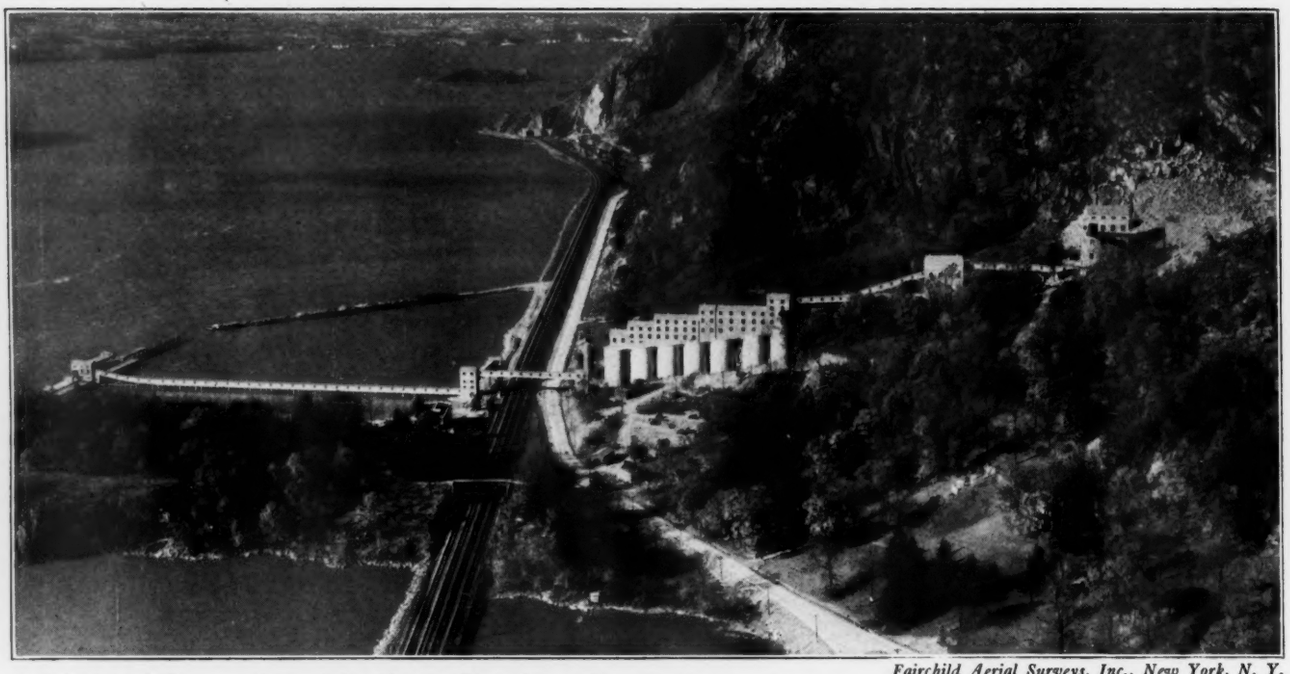
OUR cynics find particular delight in emphasizing the contradictions in our civilization as evidences of man's intellectual sterility in solving his social problems. Men who can give an instantaneous response to any question in the field of sports, business, gambling or "riotous living," are speechless and throw up their hands in despair when asked for an intelligent opinion on the troubles that beset us and the cure for them. Men who should be applying their minds—minds that have been proved fertile and resourceful in the field of the applied sciences—to questions of unemployment, better distribution of purchasing power, taxation and the like are found "in conference" playing with jig-saw puzzles, or at the brokers' offices watching stocks fall to new "lows," or at cigar counters playing five-cent gambling devices for five-cent side bets, or in hotel lobbies discussing the high cost of bootleg products and the coming of a new era of prosperity when five-cent beer shall be available for people who can not now buy five-cent bread.

These are some of the absurdities of life that give the color of truth to the lamentations of the cynics. In a time of transcendent seriousness, when every person capable of thinking in terms of the common good should be exerting his mind on problems to which he is admittedly unaccustomed, but for the solution of which he is not necessarily on that account unqualified, new playthings capture the public imagination. Where there should be soberness, there is frivolity; where there should be working, there is trifling. Hence this quest for the intelligent man, this modernized form of the Diogenes hunt for the honest man. Hence this seeking for men who are mature and who are, therefore, serious, determined, and interested in the common weal.

So far we are inclined to agree with the cynics, but beyond that we do not go. We are ready to admit the absurdity and the seriousness of the situation, but we do not share their despair. We firmly believe that man's intellect, even though it fall short of the stature given it by Linnaeus, is capable of solving our difficulties this time and at any future time. But we do not believe that this type of mind is any too common in a civilization that gives its rewards to other types of mind, nor do we believe that it is a simple matter, having found the needed type of mind, to put it to work where it can be most useful to society. Our present arrangements have not been erected on a basis of mental qualifications; our positions of responsibility, whether in business or politics, are not filled by tests for competency but by those for popularity. As a result we get just what we look for—geniality, conviviality and prodigality; and we never get what we need—mentality, experience and frugality. We believe that these qualities exist in sufficient number, that they can be uncovered and put to work, and that this is the kind of "new deal" for which the world yearns.

No section of the population has a monopoly on the type of mind needed, although some sections will reward the searcher more quickly and more lavishly than others. Although some hope that March 4 will bring these rarer, less-tried and "radical" qualities into power, we see no reason for expecting from politicians what politicians are seldom known to possess. Since politicians live out of their skill in making themselves appear necessary and useful in the general scheme of things, they can not be counted on to contribute to a common good which may seriously curtail their activities and will certainly require a considerable reduction in their number. Others feel that our salvation lies in giving business men a greater share in the control of things, and still others favor the scientific and professional classes as sources of the intelligent raw material so urgently needed. While the number of minds who are capable of recognizing and working for the general weal is doubtless relatively greater in these two walks of life than in the field of politics, business, scientific and professional training are no guaranties of independence and integrity of thinking in themselves.

NEVERTHELESS, *Homo sapiens* can be found. He can be made articulate and he can be given power and authority. But we must first learn to know him when we see him and then, having made his acquaintance, we must make certain that we shall get the benefits of his superior qualities. The cynics say it can not be done; we believe it can. In our opinion only the incentive has been lacking and this the present period has supplied. Every day thoughtful minds are emerging from the multitude; every hour determined unselfish men are making their voices heard. Soon this longing for straight thinking, for a greater decentralization of individual aims, for a more earnest and genuine devotion to the common good will be felt. Every one of us has the power, within the limitations of his capacity, for furthering this enthroning of intelligence. And, what is more important, every one of us has learned that no man is sufficient unto himself, that our distress is common, that our problems are common, and that our recovery must be the result of common effort. This is the rapidly-growing conviction of large numbers of people and it is evidence of the rising power of intelligence.



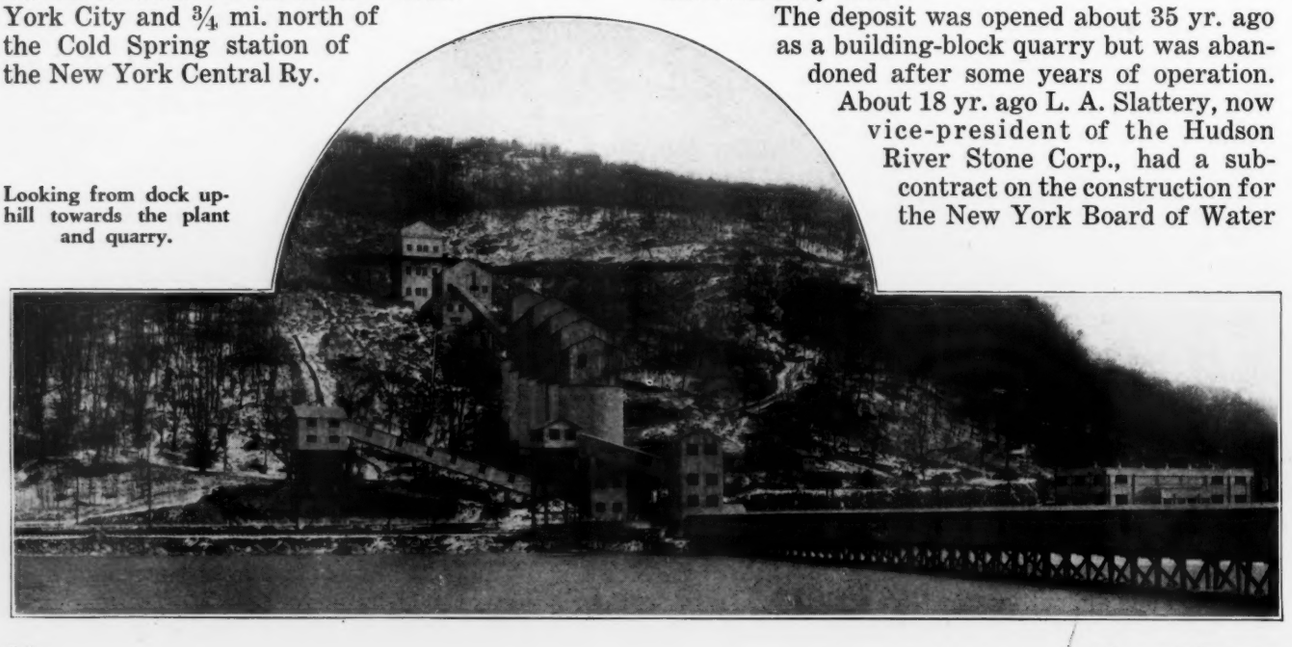
Fairchild Aerial Surveys, Inc., New York, N. Y.

Aerial view of the new plant of the Hudson River Stone Corp. looking upstream. Note the side-hill location of the plant and its proximity to three forms of transportation.

Modern Design and E in New Operation C

THE latest of a series of large and modern crushed-stone plants built to serve the world's greatest aggregate market has recently been completed by the Hudson River Stone Corp., near Cold Spring, N. Y. This new operation, said to be the largest and most modern plant in existence producing hard rock concrete aggregate and ballast rock, has a capacity of 1,000 tons per hr., crushing to 2¾ in. and smaller. The company was organized early in 1931 and the plant went into operation on Nov. 28, 1932, after a short test run.

The property being developed consists of 160 acres with a 1,500-ft. river frontage and is estimated to contain about 200,000,000 tons of available rock. It is located on the east bank of the Hudson River about 50 mi. north of New York City and ¾ mi. north of the Cold Spring station of the New York Central Ry.



Looking from dock uphill towards the plant and quarry.

whose main line passes the plant. On the side of the river opposite the plant and 3 mi. south of it is the West Point Military Academy. Many points of historical interest are located near. The town of Cold Spring was named after a spring which supplied George Washington's army with water when it was encamped at that point during the Revolutionary War.

The deposit was opened about 35 yr. ago as a building-block quarry but was abandoned after some years of operation. About 18 yr. ago L. A. Slattery, now vice-president of the Hudson River Stone Corp., had a subcontract on the construction for the New York Board of Water

Rochester Public Library
54 Court St.

Fairchild Aerial Surveys, Inc., New York, N. Y.

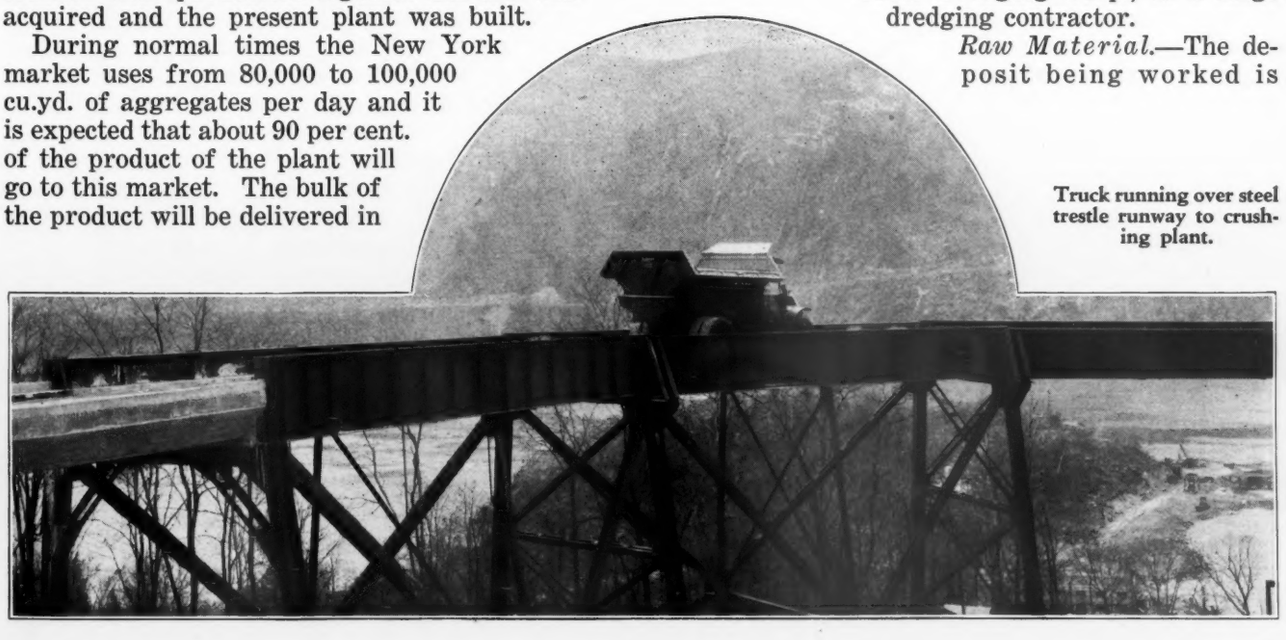
Aerial view of plant, looking downstream. Note settling cove and rip-rap quarry in back of dock conveyor. Barges shown loading at dock at extreme right.

Equipment Revealed On Hudson River

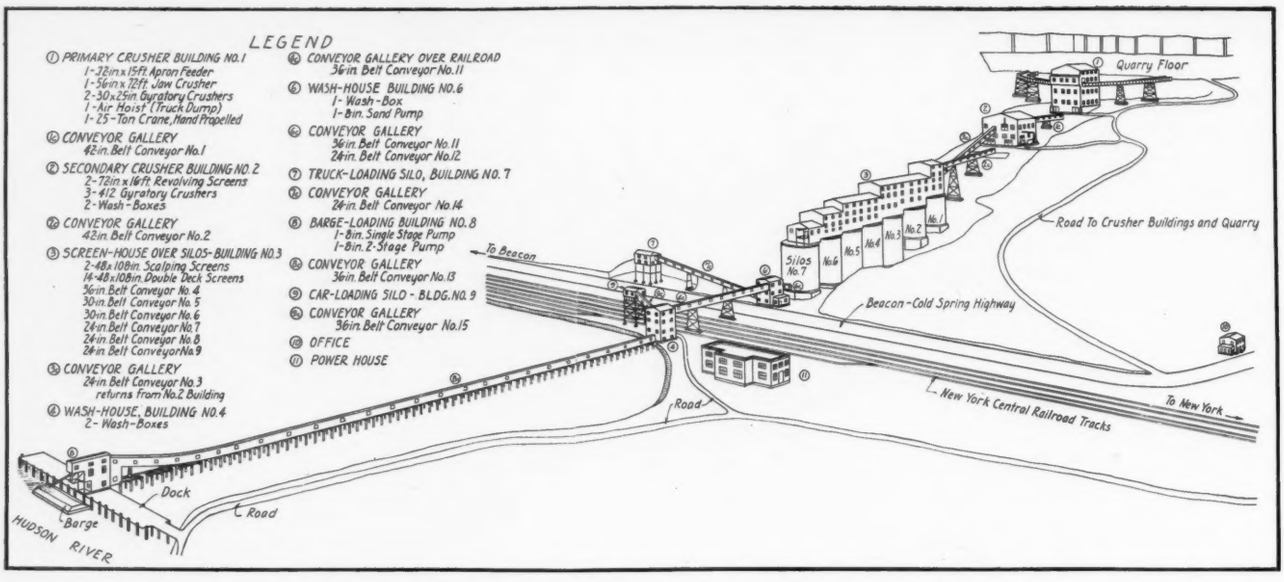
Supply of the Storm King Aqueduct about 1 mi. from the quarry and became acquainted with its possibilities as a plant site. In recent years his firm, Lyons & Slattery, purchased large quantities of gravel from the O'Brien Bros. Sand & Gravel Corp. for subway construction in New York. When these two companies decided to enter the field of crushed-stone production together this site was acquired and the present plant was built.

During normal times the New York market uses from 80,000 to 100,000 cu.yd. of aggregates per day and it is expected that about 90 per cent. of the product of the plant will go to this market. The bulk of the product will be delivered in barges of from 500 to 900 tons capacity towed by tugs able to handle 12 barges at one time. These will be used not only for metropolitan deliveries but for shipment to points along the Hudson River as well. It is also planned to use the 10,000-ton sea-going self-unloading boat *O'Brien Bros.* for shipments to coastal points. All this floating equipment is owned and operated by O'Brien Bros., Inc., which, through its subsidiary, the O'Brien Bros. Sand & Gravel Co., has been producing sand and gravel for more than three generations and operates a large fleet of equipment through another subsidiary, the O'Brien Bros. Towing Co. Yet another subsidiary, the O'Brien Bros. Shipyard Corp., operates a shipyard on Staten Island and a fourth, the O'Brien Bros. Dredging Corp., is a large dredging contractor.

Raw Material.—The deposit being worked is



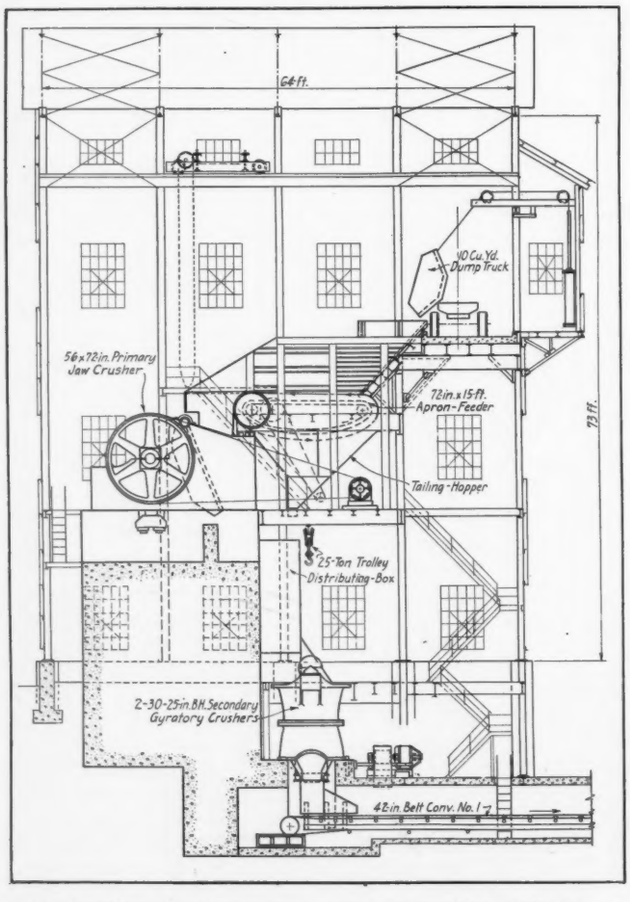
Truck running over steel trestle runway to crushing plant.



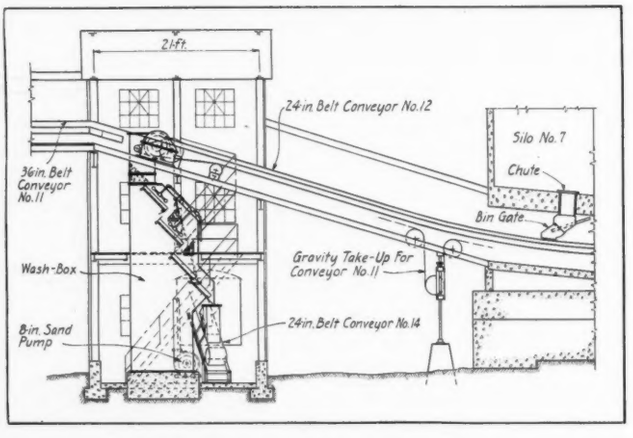
Perspective drawing of plant keyed to show locations of buildings and important equipment.

located on Mt. Taurus, which rises to an elevation of about 1,425 ft. above sea-level. The quarry level is 300 ft. above the level of Hudson River at this point and 9 ft. above the crusher dumping floor. The stone is a close-grained hard, abrasive granite and easily meets all specifications in crushing strength, abrasion, percentage of wear, percentage of absorption, hardness, etc. There is considerable overburden at the present location of the face, but as the face is carried back into the hill and becomes higher the plant washing facilities will remove all foreign material without requiring stripping.

Plan of Operation.—The plant was built to take advantage of its side-hill location. Wherever possible, gravity is utilized in the handling of the rock and there is a considerable saving in power costs. The plant is a straight-line lay-out, stretching down the mountainside for a distance of over 2,000 ft. from the crusher-house to the boat-loading dock. It consists of nine major buildings, all of steel-and-concrete construction with corrugated-metal siding and roofing. In the order of the flow of material through the plant these are: Bldg. No. 1 (primary-crushing house), in which is housed the truck-dumping equipment, the primary jaw crusher with its hopper and feeder, the two secondary gyratory crushers and their feed box. Bldg. No. 2 (secondary crushing), which houses the two revolving scalping screens and their wash-boxes and the three finishing gyratory crushers and their feed box. Bldg. No. 3 (the screen-house), which houses the 16 vibrating sizing screens, is 325 ft. long and is



Side elevation of primary and secondary crushing Bldg. No. 1.

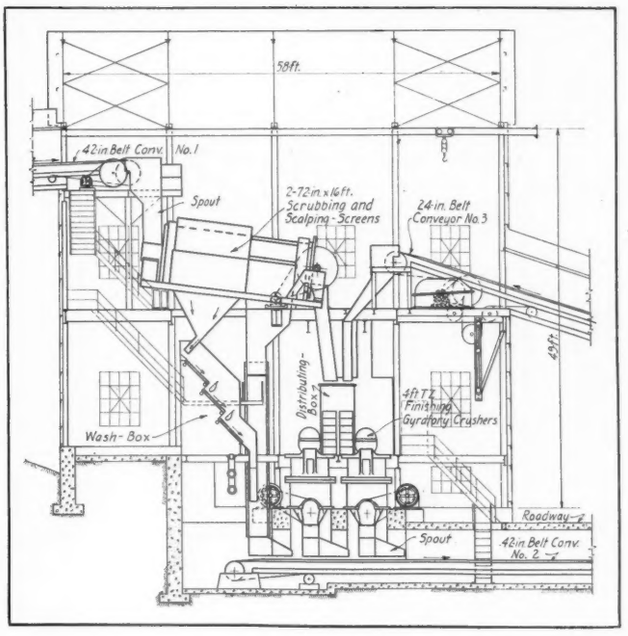


Truck-loading wash-house, Bldg. No. 6.

supported on the seven 40-ft.-diameter concrete storage silos. Conveyors in concrete tunnels under these silos feed either (1) Bldg. No. 6 (a wash-house), from which the material passes to Bldg. No. 7 for truck loading, or (2) Bldg. No. 4 (another wash-house), from which the material passes either (a) to Bldg. No. 8 on the dock for barge-loading or (b) to Bldg. No. 9 for car-loading. Bldg. No. 9 also houses the fresh-water pumps.

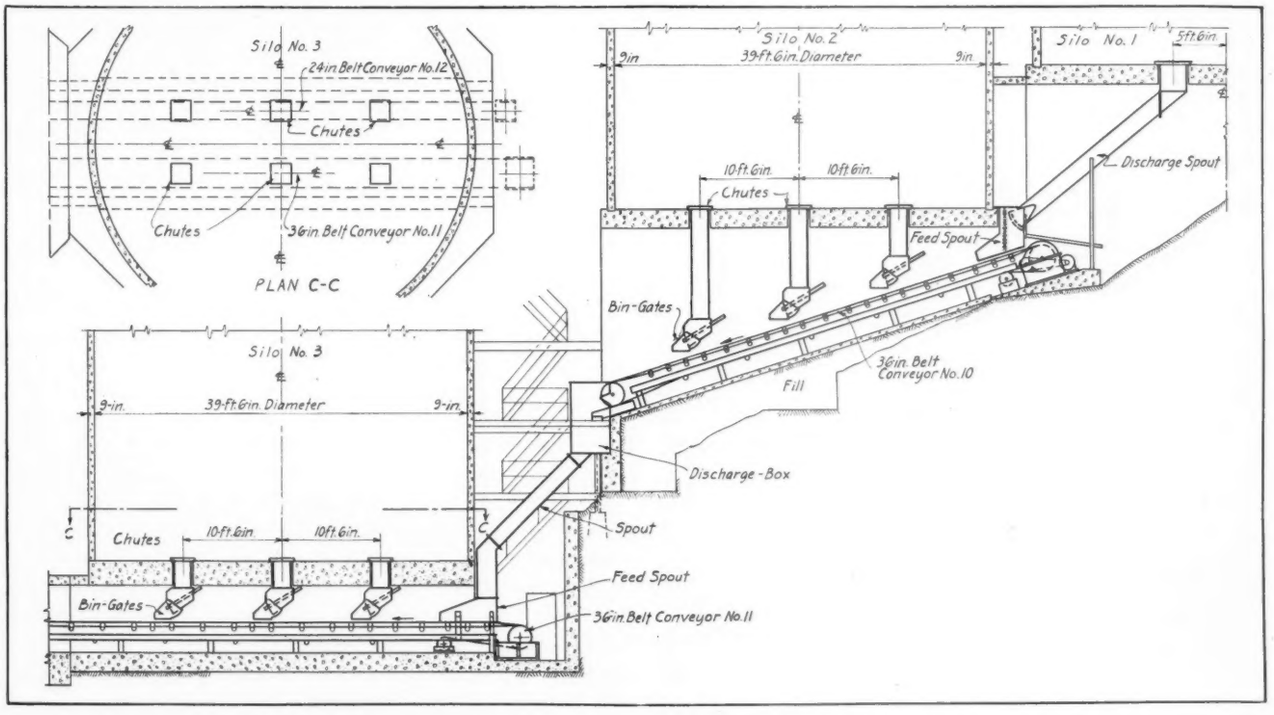
Some of the other outstanding features of the plant should be enumerated. The product is washed both before and after storage. The plant is probably the only commercial crushed-stone plant of anywhere near its size to generate its own power with Diesel engines. Seven distinct sizes of crushed and washed stone are stored separately in concrete-silo storage-bins. Practically every piece of moving equipment, including motors, speed-reducers, conveyor idlers and pulleys, etc., is provided with anti-friction bearings. Material over 1¼ in. in size can be returned to the crushers without first storing it. At present all minus ¼-in. material is wasted by discharge into a settling cove in the river. If market conditions warrant all material plus ⅛ in. can be recovered in the wash boxes. The plant is of fire-proof construction throughout; no wood is used, the building materials being limited to concrete, structural steel and copper-bearing galvanized-steel siding and roofing.

The electric motors installed in the plant have a combined rating of 2,140 hp., but at full capacity only 1,800 hp. is actually required to operate the entire plant. A 91-per cent. power factor has been attained. Although operations have not yet been conducted at capacity over an extended period, during test runs all the equipment has been fed its full capacity of material and has handled it without difficulty. Seventy-five men are required for capacity operation and only 45 men when running at one-half capacity.

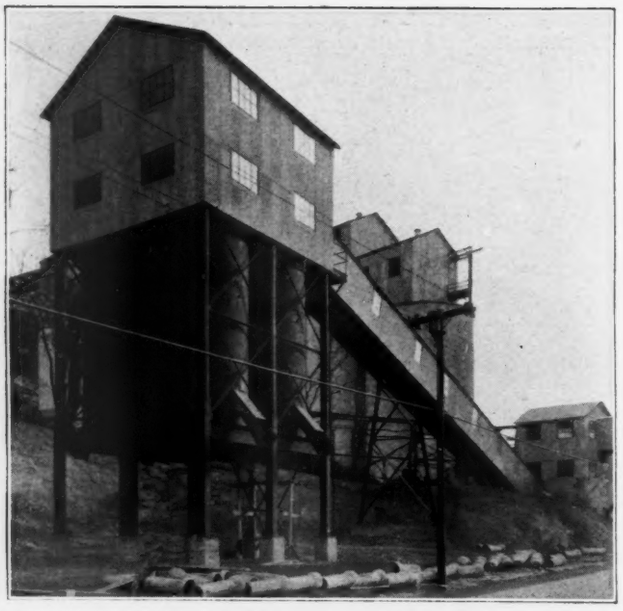


Side elevation of scalping and finish-crushing Bldg. No. 2.

Excavation.—The quarry face is being opened into the hill by a combination of coyote tunnels, well-drill holes and flat holes drilled into the quarry face, but this work is still in the experimental stage and the method which will eventually be used has not yet been decided upon. This work is being done under the direction of Sam Russel, du Pont explosives expert. A Cyclone 8-in. well-drill and Leyner No. 71 drifter drills using 2½-in. steel are being



Sectional elevation of tunnel reclaiming system under silos Nos. 1, 2 and 3 and plan of silo No. 3.



Bldg. No. 7, with truck-loading silos. Main plant and storage silos in background.

employed for drilling with the last two methods and Ingersoll-Rand 74 drifter drills are used to drive the coyote tunnels. Thurston detachable drill bits, ranging in size from 2¾ in. down, are used. Blasting is done with Du Pont dynamite and Cordeau-Bickford safety fuse. Secondary drilling is done with Ingersoll-Rand Jackhamers. At present an Osgood 1½-cu.yd. shovel loads stone into three Mack trucks having Easton 10-cu.yd. side-dump bodies for haulage to the plant. When in full operation, 10 such trucks will be used. A Marion Model 125, full-revolving crawler-mounted steam shovel, fitted with a 3½-cu.yd. dipper, is now being erected at the quarry and two other large shovels will be added later. The trucks run from quarry level to the crushing building over a curved steel-trestle runway which allows them to operate on a continuous circuit without interfering with each other.

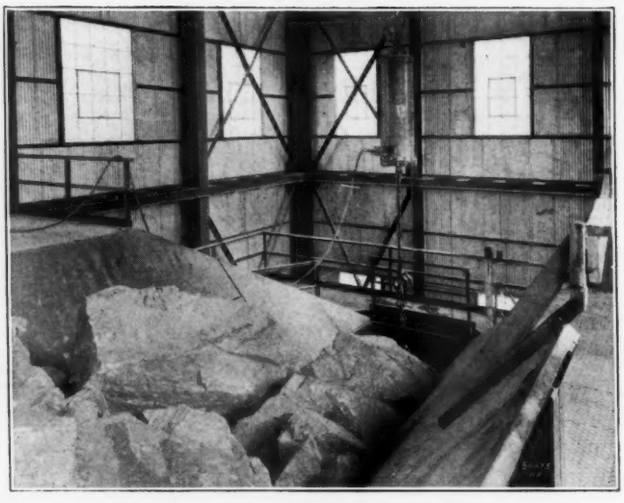
A rip-rap quarry has also been opened on a point of land on the river's edge near the power-plant.

The 3½-cu.yd. oil-burning steam shovel in process of erection at the quarry. Note negligible amount of overburden.

The material is blasted with 8-in. well-drill holes and is loaded out directly from the quarry independently of the other operations.

Primary Crushing.—The loaded trucks from the quarry enter Bldg. No. 1 on the steel-trestle roadway, and the side-dump bodies on the trucks are automatically dumped by air-cylinder hoists with hook dumping rigs into a large heavily-built open hopper above the Traylor 72-in. by 15-ft. extra-heavy steel-link apron feeder. This feeder is mounted on a heavy steel supporting frame, and is driven at the rate of 30 ft. per min. through a direct-connected speed-reducer and roller-bushed chain. The use of the chain allows the speed of this feeder to be increased at any time, if a greater capacity from the crushing plant is desired.

The feeder dumps the quarried stone uniformly into a special heavily-constructed 56-in. by 72-in. Traylor Bulldog cast-steel jaw primary crusher set to a 12-in. opening. This crusher is of modern design with water-cooled bearings and manganese-steel crushing and cheek plates and runs at about 100 r.p.m. It is of the sectional type, with sides and ends in separate pieces, and even with this form of construction, some of the castings weigh almost 40 tons. It was no mean task to get these



Apron feeder in crusher house feeding quarried stone to primary jaw crusher. Note air hoist.

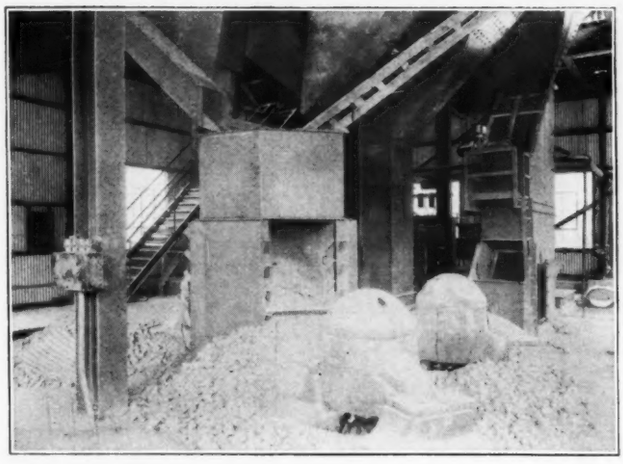
large and heavy castings up the hillside to the primary-crushing building from the railroad siding. The use of a feeder ahead of the primary crusher does away almost entirely with the bridging of large stone at the crusher opening.

The fine material that falls through between the links of the feeder is collected in a hopper and, together with the crushed product from the primary jaw crusher, is fed by gravity into a heavy, lined box fastened to the foundations supporting the jaw crusher and extending to the feed floor of the secondary gyratory crushers. This box has two large heavy doors which are open when the plant is running at full capacity. Either one of these doors may be closed if the plant is required to run at only one-half capacity, or if it is necessary to stop one of the secondary crushers.

Secondary Crushing.—The secondary gyratory

crushers are 30-25 in. Traylor BH Bulldog units, oil-cooled, fitted with manganese-steel bell-shaped heads and manganese-steel rounded inverted concaves, and having cast-steel shells and spiders and manganese-steel diaphragms and hopper liner plates. Each of these two crushers is easily able to crush 500 tons per hr. to 3½-in. size and under, taking the product that passes through the primary jaw crusher.

A 25-ton Shepard-Niles hand-propelled traveling crane in Bldg. No. 1 is used for servicing the primary crusher and its feeder. On the hook of this crane is hung a large air-cylinder hoist with tongs for breaking any bridging of large stone that may occur in the feeder or crusher. This crane can also



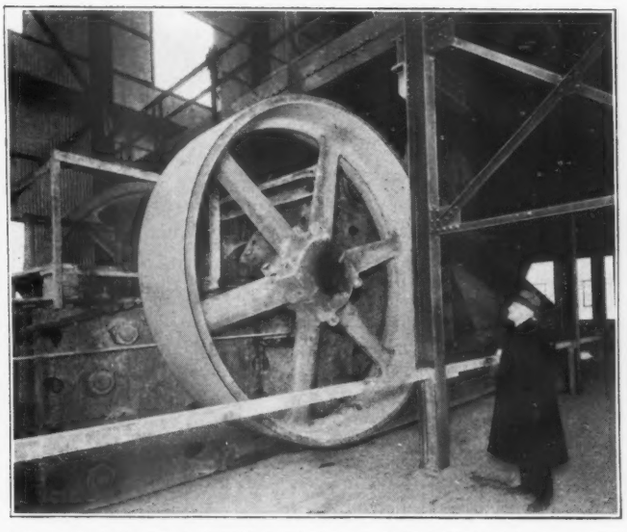
Two of the three finishing gyratory crushers with chutes and stone box.

handle parts or supplies to or from trucks on the dumping trestle previously described. A 25-ton Traylor hand-propelled geared trolley hoist, which has been provided for servicing the two secondary gyratory crushers and motors in this building, travels on a heavy I-beam which runs out through one side of the building where it can handle parts to or from trucks.

The 3½-in. and finer crushed material from the two secondary crushers is delivered to a 42-in. horizontal belt-conveyor (No. 1) which is placed on 240-ft. centers. This conveyor first passes through a tunnel about 60 ft. long, and then over a steel conveyor gallery into the top of Bldg. No. 2. Like all the other conveyors in the plant, it is equipped with anti-friction bearings throughout, and its head end is mounted on one massive base plate with a specially-designed Traylor inclosed speed-reducer unit, connecting the head shaft with the countershaft. As a matter of fact, the 15 conveyors in this plant have the same type of speed-reducer head-end drive coupled by V-rope to the motor. If at any time in the future it is desired either to increase or to decrease the speed of any conveyor, it will not be necessary to change either the motor or the speed-reducer but only the V-rope drive. All the belt-conveyors in this plant operate at speeds of from 250 to 400 ft. per min., the belts handling the large capacities operating at the higher speeds, while some of the smaller belts running between units and carrying small tonnages operate at the lower speeds. In designing the plant, the widths of the conveyor belts were confined to four sizes. All the belting was made to meet special rigid specifications.

One of the 10-cu.yd. capacity trucks shown after having discharged its load in the primary crusher building.

Scalping and Scrubbing.—Belt-conveyor No. 1 takes the 3½-in. crushed product from the secondary gyratory crushers to a two-way box spout at the top of Bldg. No. 2. This feeds two heavy-duty 72-in. by 16-ft. Traylor open-end revolving scrubber-type scalping screens. Each screen is mounted on a heavy-steel supporting frame which rests on the steel screen floor. Each of these two screens is fitted with inside manganese-steel screen plates having 2¾-in. round perforations when ballast stone is to be made and sold. Screen plates with smaller perforations can easily be installed when there is no demand for ballast. Each screen is also equipped with an outside dust jacket which is about 10 ft. long and has ⅞-in. round perforations. The material delivered by conveyor No. 1 contains all the overburden from the quarry, so it is necessary to eliminate this in delivering the material to the scalping screens. Water under 50-lb. pressure at the nozzles applied at the chutes and also in the re-



The 56-in. by 72-in. primary jaw crusher. R. L. Gainey, plant superintendent, at right.

TABULAR ANALYSIS OF THE OPERATIONS AND EQUIPMENT OF THE HUDSON RIVER STONE CORP. PLANT AT COLD SPRING, N. Y.
(Key numbers refer to the corresponding numbers on the accompanying flow-sheet.)

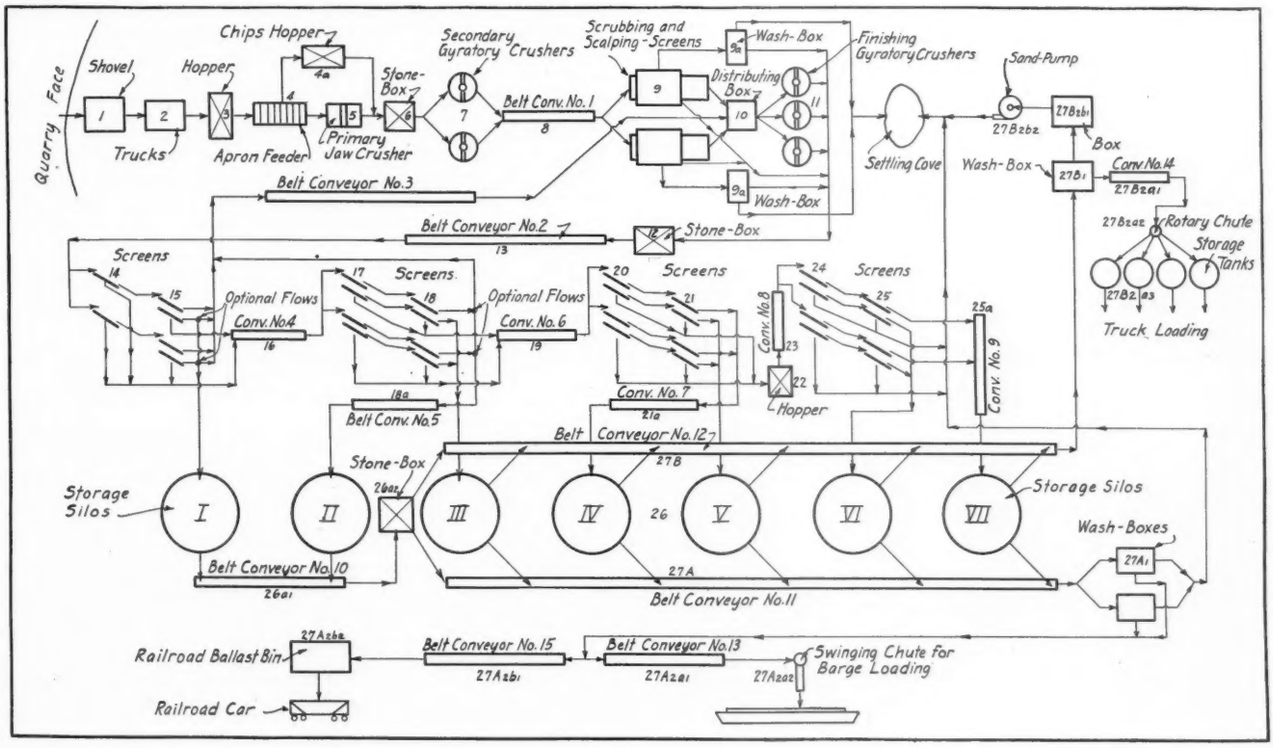
Operation	Key	Equipment	Make	Model No., Size, Capacity or Type	Power Source	Power Transmission
Loading and Transportation	1	Shovel	Marion	Type 125, 3½-cu. yd., steam		
	2	Trucks (3)	Mack	Easton 10-cu. yd. side-dump bodies		
Raw-material Handling	3	Hopper	American Bridge			
	4	Apron feeder (Chips to 4a)	Traylor	72-in., 15-ft. centers, steel link	30-hp. G. E. induction motor	Falk speed-reducer and roller-chain
	4a	Hopper for chips (To 6)	Traylor			
Primary Crushing	5	Jaw crusher (From 4a and 5)	Traylor	Bulldog 56-in. by 72-in.	250-hp. G. E. slip-ring motor	36-in. Quaker City flat belt
	6	Stone-box	Traylor			
Secondary Crushing	7	Gyratory crushers (2)	Traylor	Bulldog 30-25-in., bell-head	200-hp. G. E. slip-ring motors (2)	Gates V-rope drives
	8	Belt-conveyor No. 1	Rex-Stearns	42-in., 240-ft. centers, cap. 1,000 t. p. h., horizontal	20-hp. G. E. induction motor	Traylor speed-reducer and Gates V-rope drive
Scalping and Scrubbing	9	Revolving screens (2) (Coarse to 10; intermediate size to 12; fines to 9a)	Traylor	72-in. by 16-ft., open-end, heavy-duty	25-hp. G. E. slip-ring motors (2)	Gates V-rope drives
	9a	Wash-boxes (2) (Stone to 12, overflow to settling cove)	Traylor	Baffle-screen type		
Final Crushing		(From 9 and 15a)				
	10	Distributing box	Traylor			
	11	Gyratory crushers (3)	Traylor	Bulldog, No. 412 TZ	125-hp. G. E. slip-ring motors (3)	Gates V-rope drives
Classification: 1st Stage:		(From 9a and 11)				
	12	Stone-box	Traylor			
	13	Belt-conveyor No. 2	Rex-Stearns	42-in., 292-ft. centers, cap. 1050 t. p. h., 2 deg. down	15 hp. G. E. induction motor	Traylor speed-reducer and Gates V-rope drive
	14	Vibrating screens (2) (Oversize to 15; undersize to 14a)	Niagara	4-ft. by 9-ft., single-deck	5-hp. G. E. induction motors (2)	Gates V-rope drives
	15	Vibrating screens (2) (Top-deck oversize to 15a; bottom-deck oversize to 15a or 26, I; bottom-deck throughs to 16)	Niagara	4-ft. by 9-ft., double-deck	5-hp. G. E. induction motors (2)	Gates V-rope drives
Classification: 2d Stage		(From 14 and 15)				
	16	Belt-conveyor No. 4	Rex-Stearns	36-in., 100-ft. centers, cap. 800 t. p. h., 5½ deg. up	20-hp. G. E. induction motor	Traylor speed-reducer and Gates V-rope drive
	17	Vibrating screens (2) (Top- and bottom-deck oversize to 18; throughs to 19)	Niagara	4-ft. by 9-ft., double-deck	5-hp. G. E. induction motors (2)	Gates V-rope drives
	18	Vibrating screens (2) (Top-deck oversize to 18a or 15a; bottom-deck oversize to 26, III, or to 15a; throughs to 19)	Niagara	4 ft. by 9-ft., double-deck	5-hp. G. E. induction motors (2)	Gates V-rope drives
Classification: 3d Stage		(From 17 and 18)				
	19	Belt-conveyor No. 6	Rex-Stearns	30-in., 99-ft. centers, cap. 500 t. p. h., 14 deg. up	15-hp. G. E. induction motor	Traylor speed-reducer and Gates V-rope drive
	20	Vibrating screens (2) (Top- and bottom-deck oversize to 21; throughs to 22)	Niagara	4-ft. by 9-ft., double-deck	5-hp. G. E. induction motors (2)	Gates V-rope drives
	21	Vibrating screens (2) (Top-deck oversize to 21a; bottom-deck oversize to 26, V; throughs to 22)	Niagara	4-ft. by 9-ft., double-deck	5-hp. G. E. induction motors (2)	Gates V-rope drives
Classification: 4th Stage		(From 20 and 21)				
	22	Hopper	Traylor			
	23	Belt-conveyor No. 8	Rex-Stearns	24-in., 53-ft. centers, cap. 300 t. p. h., 13 deg. up	15-hp. G. E. induction motor	Traylor speed-reducer and Gates V-rope drive
	24	Vibrating screens (2) (Top- and bottom-deck oversize to 25; throughs to settling cove)	Niagara	4-ft. by 9-ft., double-deck	5-hp. G. E. induction motors (2)	Gates V-rope drives
	25	Vibrating screens (2) (Top-deck oversize to 25a; bottom-deck oversize to 26, VI; throughs to settling cove)	Niagara	4-ft. by 9-ft., double-deck	5-hp. G. E. induction motors (2)	Gates V-rope drives
Handling for Recrushing		(From 15 and 18)				
	15a	Belt-conveyor No. 3 (To 10)	Rex-Stearns	24-in., 315-ft. centers, cap. 300 t. p. h., 17 deg. up	40-hp. G. E. slip-ring	Traylor speed-reducer and Gates V-rope drive
Handling to Storage		(From 18)				
	18a	Belt-conveyor No. 5 (To 26, II)	Rex-Stearns	30-in., 69-ft. centers, cap. 300 t. p. h., 3 deg. up	7½-hp. G. E. induction motor	Traylor speed-reducer and Gates V-rope drive
		(From 21)				
	21a	Belt-conveyor No. 7 (To 26, IV)	Rex-Stearns	24-in., 58-ft. centers, cap. 150 t. p. h., horizontal	5-hp. G. E. induction motor	Traylor speed-reducer and Gates V-rope drive
		(From 25)				
	25a	Belt-conveyor No. 9 (To 26, VII)	Rex-Stearns	24-in., 57-ft. centers, cap. 100 t. p. h., horizontal	5-hp. G. E. induction motor	Traylor speed-reducer and Gates V-rope drive

(Continued on next page)

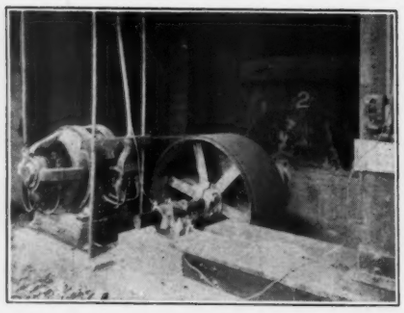
TABULAR ANALYSIS OF THE OPERATIONS AND EQUIPMENT OF THE HUDSON RIVER STONE CORP. PLANT AT COLD SPRING, N. Y. (Continued)

(Key numbers refer to the corresponding numbers on the accompanying flow-sheet.)

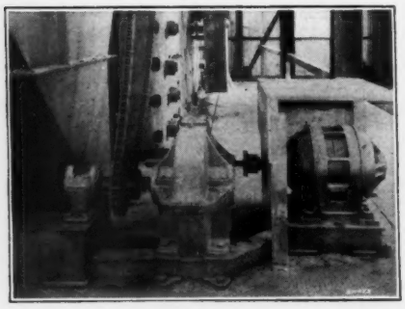
Operation	Key	Equipment	Make	Model No., Size, Capacity or Type	Power Source	Power Transmission
Storage	26, I	(From 15) Silo (2⅛-in. to 2⅝-in.) (To 26_{a1})	Macdonald-Spencer	Each 40-ft. diam., concrete; 30,000-ton total capacity		
	26, II	(From 18a) Silo (1½-in. to 2⅛-in.) (To 26_{a1})				
	26, III	(From 18) Silo (1¼-in. to 1½-in.) (To 27A or 27B)				
	26, IV	(From 21a) Silo (1-in. to 1¼-in.) (To 27A or 27B)				
	26, V	(From 21) Silo (¾-in. to 1-in.) (To 27A or 27B)				
	26, VI	(From 25) Silo (¼-in. to ⅝-in.) (To 27A or 27B)				
	26, VII	(From 25a) Silo (⅝-in. to ¾-in.) (To 27A or 27B)				
Handling of Two Largest Sizes	26_{a1}	(From 26, I and II) Belt-conveyor No. 10	Rex-Stearns	36-in., 50-ft. centers, cap. 1,000 t.p.h., 8 deg. down	7½-hp. G. E. induction motor	Traylor speed-reducer and Gates V-rope drive
	26_{a2}	Stone-box (To 27A or 27B)	Traylor			
Barge or Car Loading: Washing	27A	Belt-conveyor No. 11	Rex-Stearns	36-in., 470-ft. centers, part level, part 12 deg. up	40-hp. G. E. slip-ring motor	Traylor speed-reducer and Gates V-rope drive
	$27A_1$	Wash boxes (2) (Stone to $27A_{2a1}$ or $27A_{2b1}$; fines to settling cove)	Traylor			
Barges	$27A_{2a1}$	Belt-conveyor No. 13	Rex-Stearns	36-in., 670-ft. centers, part level, part 15 deg. up	75-hp. G. E. slip-ring motor	Traylor speed-reducer and Gates V-rope drive
	$27A_{2a2}$	Swinging chute (To barges)	Traylor			
Cars	$27A_{2b1}$	Belt-conveyor No. 15	Rex-Stearns	36-in., 75-ft. centers, cap. 1,000 t. p. h., 17 deg. up	40-hp. G. E. slip-ring motor	Traylor speed-reducer and Gates V-rope drive
	$27A_{2b2}$	Ballast-bin	American Bridge	100-cu. yd. capacity		
Truck Loading:	27B	Belt-conveyor No. 12	Rex-Stearns	24-in., 270-ft. centers, part level, part 12 deg. up	15-hp. G.E. induction motor	Traylor speed-reducer and Gates V-rope drive
Washing	$27B_1$	Wash-box (Stone to $27B_{2a1}$; fines to $27B_{2b1}$)	Traylor	Steel		
Handling	$27B_{2a1}$	Belt-conveyor No. 14	Rex-Stearns	24-in., 178-ft. centers, cap. 300 t. p. h., 17 deg. up	30-hp. G. E. induction motor	Traylor speed-reducer and Gates V-rope drive
Storing and Loading	$27B_{2a2}$	Rotating chute	Traylor	Steel		
	$27B_{2a3}$	Silos (4) (To trucks)	American Bridge	Steel, 450-cu. yd. total capacity		
Waste Disposal	$27B_{2b1}$	Box	Traylor	Steel		
	$27B_{2b2}$	Sand pump	Morris	8-in., centrifugal	75-hp. G. E. slip-ring motor	Direct-connected
Water-supply		Centrifugal pumps(2)	Goulds	8-in., 1- and 2-stage	150-hp. G. E. synchr. motors(2)	Direct-connected



Flow-sheet of Hudson River Stone Corp. plant at Cold Spring, N. Y.



Motor and drive of one of the two secondary gyratory crushers.



The motor, speed reducer and chain drive of the apron feeder.

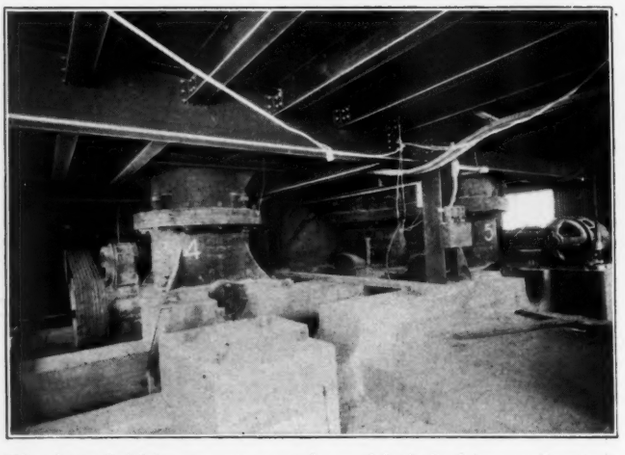
Revolving spout feeding to the four steel truck-loading silos.

volving screens does this effectively. The product which passes through the dust jackets of the revolving screens and contains the water, dirt and over-burden and small stone passing through 7/8-in. holes produced in the preceding operations, flows by gravity to two steel baffle-screen wash-boxes, one under each revolving screen. There are three baffle screens of wire mesh with 1/4-in. square openings in each wash-box. Water is applied at the baffle screens through spray pipes at 50-lb. pressure at the nozzles so that all the dirt and overburden, together with the dirty water, runs off from these boxes into a launder outside the building and over the state highway and New York Central R. R. to the settling cove in the river, or flows direct into the wash-house (Bldg. No. 6), where it is picked up by an 8-in. sand pump and sent to the settling cove in the river. The cleaned and washed small stone or oversize from these wash-boxes, which is plus 1/4-in. and minus 7/8-in. material, falls by gravity to a stone-box that feeds belt-conveyor No. 2 in the bottom of Bldg. No. 2.

The product which passes through the inside screen shell of the revolving screens previously described, or plus 7/8-in. minus 2 3/4-in. material, also falls by gravity to this belt-conveyor. The oversize material from these revolving screens, plus 2 3/4-in., falls by gravity into a distributing box on the feed floor of the finishing gyratory crushers in this building.

A 2-ton chain-block with a trolley services the two revolving screens and motors and travels on an I-beam which runs out through the west end of the building where it can handle parts to or from trucks. A 10-ton chain-block with a trolley is provided for servicing the battery of finishing gyratory crushers and motors, and travels on heavy I-beams which run out to one side of the building where it can also handle parts or supplies to or from trucks.

Final Crushing.—Although only three No. 412 TZ Traylor Bulldog finishing gyratory crushers are now placed, there is space for one more which can be installed should the present trend toward the use of smaller sizes of aggregate continue. These crushers are oil cooled and fitted with manganese-steel bell-shaped mantle head and manganese steel rounded inverted concaves, together with manganese-steel diaphragm liners and manganese-steel hopper liners, as well as cast-steel shells and spiders, and are set to crush within a range of 3/4 in. to 1 1/2 in. The distributing box in the center of this battery of finishing gyratory crushers is so constructed that any of its openings can easily be closed if it is necessary to stop any of the crushers.



The three finishing gyratory crushers with their drives and motors.

The two secondary gyratory crushers with controls and transformers at right.

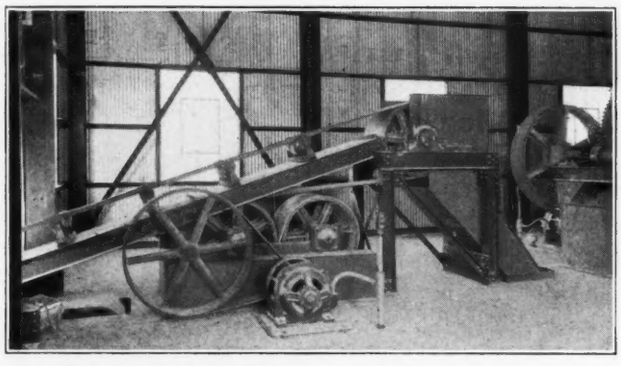
The crushed product from these crushers, together with the minus 2 3/4-in. product and the minus 7/8-in. cleaned small stone from the revolving screens, is collected in a common feed box which feeds belt-conveyor No. 2, which is 42 in. wide, operates on 292-ft. centers, and runs on a downgrade of about 2 per cent. This conveyor passes through a 65-ft. tunnel under Bldg. No. 2, and then over a steel conveyor trestle into the top of Bldg. No. 3, the screen-house.

All the drives for the conveyors which run either

slightly downgrade or up an incline are fitted with back-stops, so that the belts with their loaded material can not run away, as in the case of a failure of a motor or of the power-supply.

Conveyor No. 2, which is fitted with a gravity take-up at the east end of Bldg. No. 3 and near the head pulley, handles all minus 2¾-in. and plus ¼-in. material, and delivers it to a steel box having two-way spout.

In this screen-house there are 16 Niagara vibrating screens, each 4 ft. wide and 9 ft. long. Fourteen of these are of double-deck and the first two of single-deck construction. All are of the suspension type, hung by cable and shackle from overhead supporting steel members, thus avoiding any excessive vibrations. Each screen motor is attached to



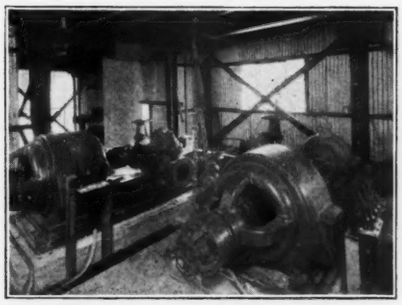
Tandem pulley drive arrangement of Belt Conveyor No. 2.

an angle-iron support secured to the screen frame, so that the entire screen with its drive and motor is free to swing.

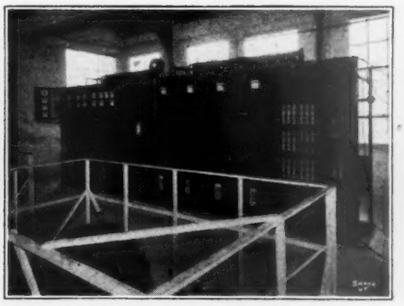
First Classification.—The first two vibrating screens have 2⅛-in. square openings and all the product which passes through these openings falls into a large steel hopper which feeds belt-conveyor No. 4. The oversize from these two screens passes the first two double-deck vibrating screens which have 2⅝-in. square openings on their top decks and 2⅛-in. on their bottom decks. This 2⅝-in. top deck will be used only when ballast rock or large-size concrete-base stone is being made. The oversize from this double-deck screen or material larger than 2⅝ in.—which may not be more than 2 per cent. of the material fed to it in the ordinary operation of the plant—goes by chute to a 24-in. belt-conveyor (No. 3). This operates on 315-ft. centers, is set on about a 17-deg. inclination and has a gravity take-up and a tandem drive. The product coming from between the two decks, the plus 2⅛-in. minus 2⅝-in. material, falls by gravity through a steel chute into concrete silo No. I. When this silo is full, or when it is not desired to store any of this particular class of material, this product is by-passed to conveyor No. 3 which feeds back to the finishing gyratory crushers in Bldg. No. 2 for re-crushing. This recrushed material returns to Bldg. No. 3 on belt-conveyor No. 2.

Tunnel conveyors Nos. 11 and 12 showing type of discharge gates used.

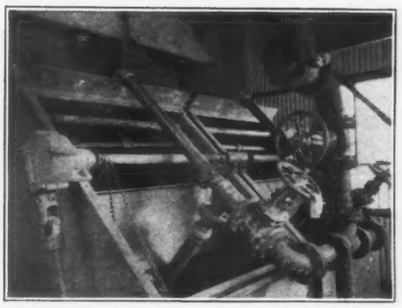
Second Classification.—All minus 2⅛-in. material from the second pair of screens is conveyed by a 36-in. belt-conveyor (No. 4), which operates on 100-ft. centers up a 5½-deg. inclination to another battery of four double-deck vibrating screens. The latter are fitted with 1½-in. square openings on their top decks and 1¼-in. square openings on their bottom decks. The oversize from these screens, plus 1½-in. and minus 2⅛-in. material, drops by gravity through chutes to a 30-in. belt-conveyor which runs on 69-ft. centers. This conveyor (No. 5) is inclined at 3 deg. and delivers to concrete silo No. II. The product retained on the lower deck, plus 1¼-in. and minus 1½-in., falls directly by gravity into silo No. III. When there is no further demand for material larger than 1¼-in., or when silos Nos. II and III are full, these two sizes of stone can be by-passed to belt-conveyor No. 3 and sent back to Bldg. No. 2 for recrushing to smaller sizes for storage in silos which may not be full. In this manner the plant may be operated full capacity



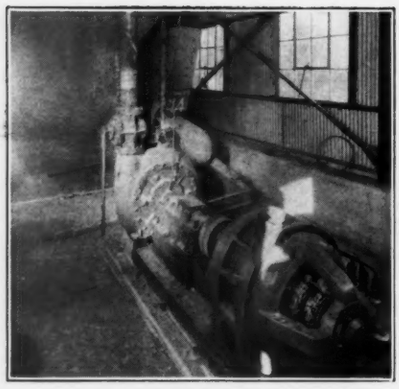
The two 8-in. wash-water pumps shown disconnected to prevent freezing.



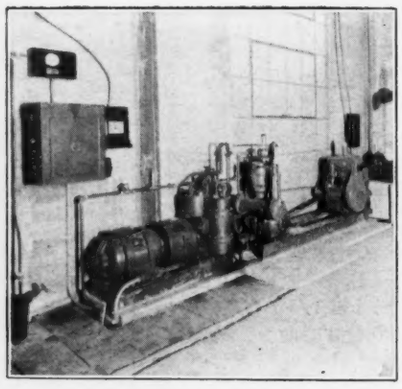
The main plant switchboard located in the power house. Exciter in foreground.



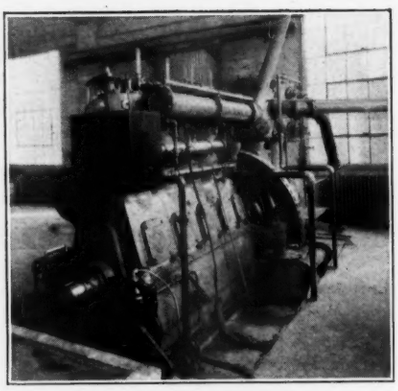
The wash boxes in wash house No. 4 showing arrangement of valves and pipes.



The 8-in. sand pump in Wash House No. 6. Conveyor No. 14 to truck-loading silos in background.



Starting compressor for Diesel engines with its controls and cooling water pump at right.

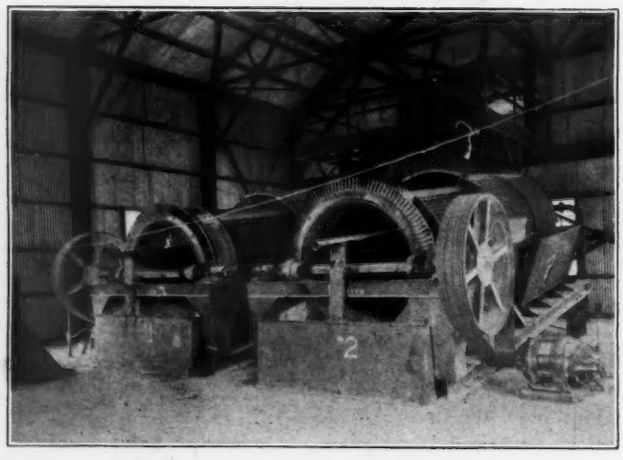


Diesel-engine-driven compressor in power house. A duplicate unit is located at the quarry.

without producing any sizes which are not being shipped.

Third Classification.—The material which passes through the lower decks of these four vibrating screens, minus 1¼-in., is taken by belt-conveyor No. 6, which is 30 in. wide and operates on 99-ft. centers at a 14-deg. inclination, to another battery of four vibrating screens having top decks with 1-in. and lower decks with ¾-in. square openings. The oversize from these screens, plus 1-in. minus 1¼-in. material, is sent to silo No. IV by a 24-in. belt-conveyor (No. 7), which operates on 58-ft. centers and is horizontal. The material retained on the lower decks, plus ¾-in. minus 1-in., falls through chutes directly into silo No. V. The material which passes through the lower decks, minus ¾-in., falls into hoppers and is fed by chutes to a 24-in. belt conveyor (No. 8) operating on 53-ft. centers and at a 13-deg. inclination.

Fourth Classification.—This delivers the minus ¾-in. material to the last battery of four double-deck vibrating screens. These are fitted with ⅝-in. square openings on their top decks and ¼-in. square openings on their lower decks. The material coming from between the decks of these screens, minus ⅝-in. and plus ¼-in., falls through chutes directly into silo No. VI. The oversize product retained on the top decks, plus ⅝-in. and minus ¾-in., is conveyed to silo No. VII by a 24-in. horizontal belt-conveyor (No. 9) operating on 57-ft. centers. The fine material, minus ¼-in., passing through the bottom decks of these vibrating screens is sluiced by water to the launder, which takes the dirt and overburden from Bldg. No. 2 directly to the settling cove in the river or to the wash-house (Bldg. No. 6).



The two revolving scalping and scrubbing screens with their V-rope drives.

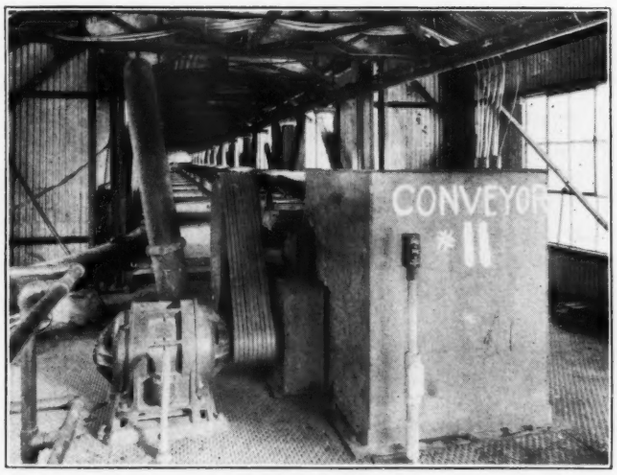
A 2-ton chain block and trolley is provided in the west end of the screen-house over the No. VII silo for lifting any parts required for motors, conveyors or vibrating screens in this building.

Storage.—As has been previously stated the screen-house (Bldg. No. 3) is built on the tops of the seven concrete storage-silos which have a total storage capacity of 30,000 tons. Each of these silos is 40 ft. in diameter and has 9-in. walls reinforced both horizontally and vertically. The silos vary in height above their foundations from 55 ft. to 90 ft., to conform with the contour of the ground on which their foundations rest. Silos Nos. I, II and III rest on solid rock, whereas silos Nos. IV, V, VI and VII are built on good soil with a 3½-ft. thickness of reinforced concrete mattress foundation connecting all four silos. A concrete tunnel on the top of the silo foundations extends the full length of the silos and houses the reclaiming belt-conveyors. This tunnel is reinforced throughout, the walls being about 15 in. thick while the roofs vary from 24 to 30 in. in thickness, and its inside cross-section is 7 ft. high in the clear and 11 ft. wide. Gate boxes 24-in. square are built in the concrete-tunnel roof, 6 for each silo, and specially-constructed swinging gates fastened to the ends of these boxes deliver the material from the silos to the tunnel belt-conveyors. These gates can be manipulated so as to give a full flow of material to each belt-conveyor, or a partial load when it is desired to mix various sizes of aggregate stone for loading.

Under concrete silo No. I, which contains large-size or ballast rock, a long chute with a large opening and a swinging gate feeds conveyor No. 10, under silo No. II. This belt-conveyor is 36 in. wide, operates on 50-ft. centers and runs downgrade 8 deg. It has the same type of motor drive through V-rope as the other conveyors but has an automatic solenoid brake instead of a backstop. This conveyor also gets a feed of plus 1½-in. minus 2⅛-in. material from silo No. II through the gates pre-

viously described, and discharges it through a chute into a box that feeds either one or both of two long belt-conveyors (Nos. 11 and 12).

Truck Loading.—Conveyor No. 12 is 24 in. wide and operates on 270-ft. centers. It is horizontal for 200 ft. of its length and then goes up a 12-deg. incline into the wash-house (Bldg. No. 6), just east of the new state highway between Cold Spring and Beacon. The material on this conveyor, which may be any size from any of the silos, is dumped into a steel wash-box fitted with baffle screens similar to the ones used in Bldg. No. 2. Spray pipes with water at 50-lb. pressure at the nozzles thoroughly clean and rinse the product. This box has a washing capacity of about 300 tons per hr. The cleaned stone is then fed to conveyor No. 14, which is 24 in. wide and on 178-ft. centers and is set at a 17-deg. incline. The material discharged by this conveyor falls into a swivel or rotating chute that feeds any one of four steel storage-tanks, which are about 12 ft. in diameter and 18 ft. high and have capacities of about 100 tons each. These tanks are equipped



Conveyor No. 11 with its V-rope drive and motor.

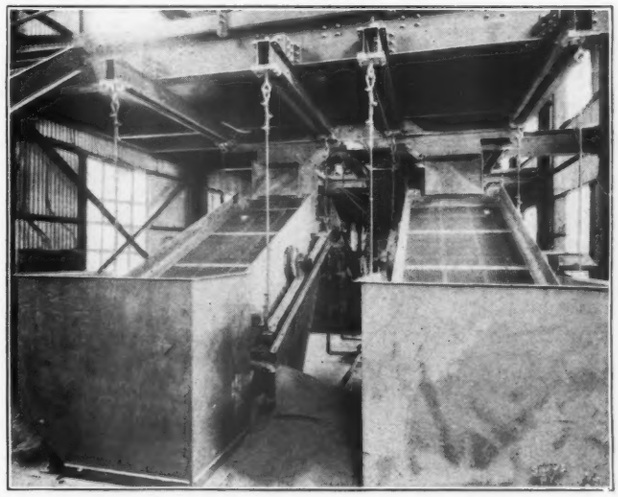
with bottom duplex gates and side swing gates, and are set high enough so that 8 motor trucks can be loaded at the same time. These steel bins are in Bldg. No. 7, which is known as the truck-loading silo building.

The dirty water and fine material coming through the ¼-in. baffle screens of the wash-box in Bldg. No. 6 go to a large steel box, from which the material is forced by an 8-in. centrifugal sand dredge pump, through piping in a conveyor gallery, over the highway and railroad to the settling cove in the river. Sufficient space is left in Bldg. No. 6 for a duplicate pump and motor if conditions ever warrant the installation of another pumping unit.

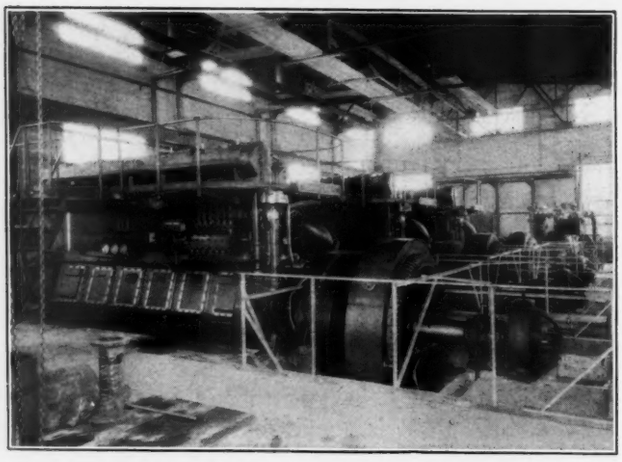
Car and Barge Loading.—Belt-conveyor No. 11, which is 36 in. wide, runs on 470-ft. centers, and also operates in the concrete tunnel under the silos, is used only for railroad and barge loading and also handles any size of material from any of the silos. It runs horizontally for about 200 ft., then rises on a 12-deg. incline for approximately 100 ft., and again runs horizontally through the steel-and-concrete conveyor gallery over the state highway and railroad tracks to the wash-house (Bldg. No. 4), which is on the river edge and just west of the railroad tracks. In this wash-house there are two large wash-boxes similar to the one found in the other wash-house (Bldg. No. 6), and the baffle screens are similarly adjustable so as to give different inclinations for the different sizes of stone. The stone is split to these two boxes and is thoroughly cleaned and rinsed by water applied with 50-lb. pressure at the nozzles. The dirty water and dirt flow into the settling cove adjacent to this building, which has a washing capacity of about 1,000 tons per hr.

If it is desired to make railroad shipments, the stone at this point is conveyed to the railroad-ballast bin over the private siding or spur by belt-conveyor No. 15, which is 36 in. wide and operates on 75-ft. centers up a 17-deg. inclination. When barges are to be loaded, the washed material coming through the wash-house (Bldg. No. 4) is delivered to dock belt-conveyor No. 13, which is 36 in. wide and operates on 670-ft. centers. This conveyor has a tandem drive and a gravity take-up, is horizontal for about 500 ft. of its length and runs up a 15-deg. grade for the remainder of its length. It runs in a steel conveyor gallery on the top of a wood-pile trestle and delivers the product at the end to a swinging chute for barge loading.

Water-Supply.—All the wash-water used in this plant is furnished by two 8-in. centrifugal pumps located in Bldg. No. 8 on the barge-loading dock. One pump is a single-stage unit with a capacity of 2,000 gal. per min. at 100-lb. pressure and the other is a two-stage pump with a capacity of 1,000 gal. per min. at 200-lb. pressure. The two motors driving these pumps are the only synchronous motors used in the plant, and when the entire plant is operating, both pumps are operating. The single-stage pump furnishes water for washing in the two wash-houses (Bldgs. Nos. 4 and 6), while the 2-stage pump supplies water for the two revolving scrubber type scalping screens in Bldg. No. 2 and the last set of vibrating screens in Bldg. No. 3. When the plant is only crushing and screening and no unloading is being done only the 2-stage pump is used,



Set of four double-deck vibrating screens over Silos Nos. 6 and 7.



The three 660-hp. Diesel engines with their generators and exciters at right.

while when the plant is not doing any crushing or screening, but simply loading, only the single-stage pump is used.

Power-Plant.—When the plant was designed, the officials of the company thoroughly investigated the possibilities for effecting a saving in power costs by the erection of their own Diesel-engine electric power-plant. It was found that power could be generated at a lower cost per kw. hr. for an 8-hr. day than that for which it could be purchased and that this cost would be even lower when running a longer day. It was decided to use three separate generating units to give the greatest possible flexibility for any operating conditions and combinations likely to be met, and space has been left for a fourth unit should this ever be needed.

The power-house is a concrete structure, 42 ft. wide, 90 ft. long and 25 ft. high to the eaves, and has steel-sash windows and doors and structural-steel roof framework covered with H. H. Robertson roofing. In addition to the power-plant, it houses the central switchboards which control the distribution of power to all parts of the plant. For convenience this building is located on a railroad siding near the car-loading building and near the river bank.

The power-plant equipment consists of three 6-cycle McIntosh & Seymour 4-cycle solid-injection Diesel engines rated at 660-hp. at 300 r.p.m., complete with all their accessories and equipment. Each is direct-connected to a 500-kw. generator having a directly-attached 14-kw., 125-v., d.-c. exciter. A 20,000-gal. fuel-oil supply tank for each engine is provided on concrete saddle foundations about 75 ft. west of the power-plant, or about 150 ft. west of the railroad tracks. Provision is made to fill these tanks either from an oil tank-ship at the dock or by a pump from tank-cars at the railroad siding, or from trucks. The oil from these storage-tanks flows to the daily supply tanks located near the engines in the power-plant. Merco-Nordstrom lubricated-plug type valves are used in the oil lines.

A complete water-cooling system for the Diesel engines is provided. This consists of De Laval 4-in. and 5-in. centrifugal water-supply pumps direct-connected to motors, water-supply storage tanks and a water-cooling tower. Well water, of which there is a plentiful supply within 500 ft. of the power-plant, is used for cooling. Provision is also made for using the river water from the 8-in. centrifugal water pumps in an emergency.

The generators produce 3-phase, 60-cycle, 2,300-v. alternating current. In a room in the power-house there is a manually-operated central switchboard with panels and instruments for each engine. The cables taking power from the bus bars behind these switchboards run in underground conduits to a concrete junction box or house adjoining the wash-house (Bldg. No. 4) west of the railroad tracks. From this point the necessary 2,300-v. wires run inside the conveyor gallery on the dock trestle to the dock and supply the motors driving the dock conveyor (No. 13) and the two water pumps. A small bank of transformers, located in Bldg. No. 9 on the end of the dock, steps down part of the current of this 2,300-v. line to 440 v. for excitation of the synchronous pump motors and for the small motors operating the dock winches and the hoist used for manipulating the loading chute and barges. Another 2,300-v. line runs from the concrete junction house into the wash-house (Bldg. No. 4), then through the steel conveyor gallery or bridge over the state highway and railroad tracks and the tunnel under the concrete silos to Bldgs. Nos. 1 and 2, where practically all the motors are 2,300-v. machines. Between silos Nos. II and III is a stairway leading from the ground up to the top of the silos into Bldg. No. 3. A bank of transformers, located in a separate room adjoining the stairway near the ground-line, steps down part of the current of this 2,300-v. line to 440 v. This 440-v. line runs up into Bldg. No. 3 and supplies current for all the conveyor and screen motors. It also runs through the conveyor gallery between Bldgs. Nos. 2 and 3 to operate the few small motors in Bldg. No. 2. Transformers are also provided in the room near Silo No. II for stepping the voltage down for lighting purposes and for operating a bell signal and siren system through the entire plant.

Because of the dust conditions in Bldgs. No. 1 and 2, all the controls for the motors in these buildings are located in separate dust-proof control rooms. Each push-button station is in an advantageous position, usually adjacent to the motors. All the control equipment for the vibrating screens and the conveyors in Bldg. No. 3 is grouped near the motors. The control equipment and transformers on the dock are in a separate house. All the plant motors are interlocked through magnetic locks and push-button control so that the failure of one unit will automatically stop those preceding it.

Two Chicago Pneumatic 1,200-cu.ft. capacity air-compressors, each direct-connected to a 165-hp. Diesel engine of the same make, furnish air for the plant and quarry operations. One of these is located in the power-house and the other in a separate building near the quarry. Space has been provided in the power-house for the installation of an additional compressor should it ever be needed.

Material and Equipment.—The entire operation, with the exception of the Diesel-engine power-

plant, was designed in complete detail by the Traylor Eng. & Mfg. Co., in conjunction with the Lyons & Slattery Co., Inc. All the construction work, except that for the steel structures and the concrete storage silos, was done by the Hudson River Stone Corp. under the direction of Louis A. Slattery, vice-president, and Walter Caccia, chief engineer, with the aid of the Traylor Eng. & Mfg. Co., which also furnished most of the major equipment and specified and purchased the remainder. All the equipment was installed by the stone company under the supervision of the Traylor company. R. A. Gainey, general superintendent; A. Craig, assistant engineer; and O. J. de Gaetano, electrical engineer—all of the Lyons & Slattery Co.—also assisted in the supervision of the construction and the installation of equipment. The concrete storage silos were constructed by the Macdonald-Spencer Engineering Co. All the steel work, including the steel buildings, truck-loading storage-tanks, railroad ballast bin and corrugated roofing and siding, was furnished and erected by the American Bridge Co.

Special attention was paid to safety features in designing this plant. Ample headroom and space around equipment, safety guards and rails, hoists for heavy lifts, enclosed switches, and automatic electric interlocking control are some of the features.

A list of the manufacturers who furnished equipment for this plant and the equipment furnished by them follows:

Traylor Eng. & Mfg. Co.—Crushers, apron feeder, revolving scalping screens, speed-reducer units, bin gates, bin boxes, chutes, hoppers and liner plates.

General Electric Co.—Generators, motors, control equipment, transformers, switchboards and panels.

Chain Belt Co.—Belt-conveying equipment, including Rex-Stearns Timken troughing and return idlers and head and tail iron equipment.

Niagara Concrete Mixer Co.—Vibrating screens.

Timken Roller Bearing Co.
S. K. F. Industries, Inc.
Dodge Mfg. Co.
} All dust-proof anti-friction bearings.

American Manganese Steel Co.—Most of the revolving-screen perforated plates, crusher cheek plates and jaw plates, heads and concaves, and hopper and chute liners.

Taylor-Wharton Iron & Steel Co.—Some of the equipment just mentioned and manganese liner plates in the truck bodies.

W. S. Tyler Co.—Tyloy screen cloth for the vibrating screens.

Quaker City Rubber Co.—Part of the conveyor belting and the primary-crusher drive belt.

New York Rubber Co.—Part of the conveyor belting.

Morris Machine Works—Centrifugal sand dredge pump.

McIntosh & Seymour Corp.—Diesel engines for driving the generators, complete with all accessories except water pumps and cooling system.

Curtis Pneumatic Machy. Co. — Air-cylinder hoists.

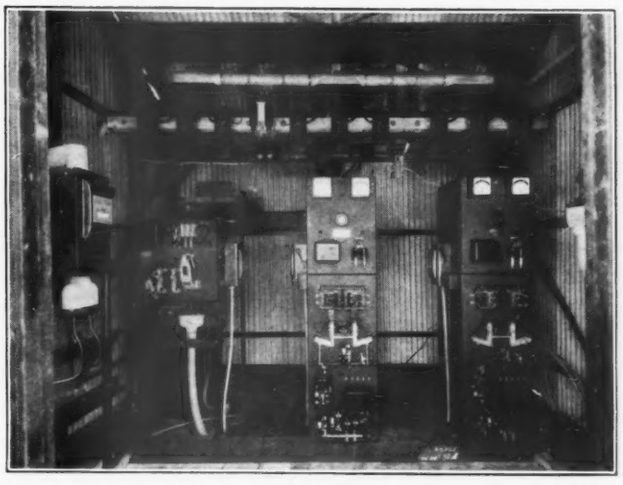
Gates Rubber Co.—All V-rope drive belts.

Goulds Mfg. Co.—Water-supply pumps.

Shepard-Niles Crane & Hoist Co.—The 25-ton traveling crane in Bldg. No. 1 and the 3-ton crane in the power-house.

American Bridge Co.—All the steel buildings and truck-loading storage-tanks, and corrugated roofing and siding.

Merco-Nordstrom Valve Co.—Lubricated-plug type valves on the oil lines and in the crushing plant sand lines where standard gate valves could not be used.



Interior of control room on dock showing water pump and dock conveyor controls.

Company Personnel.—The Hudson River Stone Corp. is owned jointly by the O'Brien Bros. Sand & Gravel Co. and the Lyons & Slattery Co., Inc., both of New York City. The main office of the company is at 233 Broadway. The company's officers are: J. J. O'Brien, president; Louis A. Slattery, vice-president; M. J. Lyons, treasurer; J. V. O'Brien, assistant treasurer; T. F. O'Brien, Jr., secretary. R. Gainey is plant superintendent.

Slate Production in 1932

Slate sold at the quarries of the United States in 1932 amounted to approximately 272,400 short tons, valued at $2,990,000, according to figures compiled from estimates furnished by slate producers. This was a decrease of 26 per cent. in quantity and 46 per cent. in value from the output for 1931—368,420 short tons valued at $5,498,336.

The roofing slate sold in 1932, estimated at 136,000 squares and valued at $1,000,000, decreased 51 per cent. in quantity and 58 per cent. in value from 1931. The drop in value represents a decrease of $1.17 in the average value per square. Total sales of mill stock in 1932, estimated at 2,828,300 sq. ft., valued at $830,000, decreased 51 per cent. in quantity and 53 per cent. in value in comparison with 1931. Slate sold for flagging, cross-walks, stepping-stones, etc., was estimated at 296,000 sq. ft., valued at $33,000 in 1932, a decrease of 61 per cent. in quantity and of 51 per cent. in value compared with 1931.

Definite Program to Guide Construction Industries Drafted at Detroit

First Highway and Building Congress Brings Together Thousands of Leaders

THE rising tide of unemployment can be stemmed only by a continuation of road building and a revival of general construction, according to authorities who addressed the 20,000 or more persons gathered at Detroit, Mich., during the week of January 16-20 in the first Highway and Building Congress.

A major part of the programs of the 22 national organizations which participated in the Congress was devoted to the laying out of plans to keep funds from motor-vehicle license fees and gasoline taxes from being diverted to uses other than that for which they were originally intended—that of building and maintaining the roads.

NUMEROUS speakers directed attention to the fact that misuse or diversion of motor tax funds was constantly adding new numbers to the ranks of the unemployed. The failure to provide Federal-aid funds was shown as a serious handicap to the states which are unable to make definite plans for road construction for the latter half of this year and for 1934.

Thomas H. MacDonald, Chief of the U. S. Bureau of Public Roads, declared: "The most significant fact is that highways and highway transport are a going concern. What other major activity has held so closely to prosperity levels?" Mr. MacDonald pointed out that directly and indirectly 1,000,000 persons were employed in highway work in 1932. He cited figures to show that in the manufacture and operation of automobiles no less than 3,600,000 persons have jobs.

ONE of the most forceful addresses at the Congress was that of Martin L. Pulcher, of the National Automobile Chamber of Commerce at Washington, D. C. Mr. Pulcher made a strong plea for highways and highway transportation as the outstanding factors in economic recovery. He pointed out that the jobs of millions are at stake in the continued improvement, maintenance and use of highway transportation. The lives of practically everyone are dependent upon roads and streets and the vehicles of commerce that use them, he pointed out. Motor trucks—nearly four million of them—in daily use delivering milk, groceries, mail, fuels, building materials, and a thousand and one other commodities, serving the people and paying their way in the building of streets and highways are a true necessity in the modern scheme of things, Mr. Pulcher pointed out. But he sounded a warning that the increasing tax load being borne by these carriers is already tending to decrease their use and abandon their operation entirely in some instances. He was of the opinion that the motor-vehicle owner was as much entitled to a tax reduction as any other taxpayer and indicated that this should be accomplished by lowering rather than raising the tax on gasoline and license fees, and giving the vehicle owner a reduction in taxes as a prior right, rather than attempting to aid the general public by loading the vehicle owner with taxes and then diverting them for the purpose of relieving the tax load on the public at large.

If justification were needed for a continuation of road building and maintenance, there is no better instance of its value, said Mr. Pulcher, than that cited by Secretary of Agriculture Hyde, recently:

"Our roads provide our only collection and distribution facilities. Their preponderant uses are local. Their use for the daily and continuous flow of agricultural products to markets has developed into an essential element of countless agricultural operations. The cost of such transportation must be kept at the lowest possible point to keep at the minimum the spread between prices paid the producer and prices charged the consumer. This is a tremendous element in the rate of consumption of agricultural products.

"In the problems which now arise through the marginal competition between the railroads and highways, the fact of the necessity of highway building, as such, must be disassociated from the limited use which is competitive. Proposals to impose higher taxes upon motor vehicles, particularly motor trucks, as a means of limiting competition with the railroads must be carefully scrutinized in the light of their inevitable principal use for the purpose of feeding to, and distributing from, the railroads, the goods hauled by the railroads."

Willard T. Chevalier, publishing director of the McGraw-Hill Publishing Co., reviewed the development of highways, emphasizing that federal-aid highways are truly self-liquidating projects and as such are deserving of the full and continued support of the federal government.

Other speakers before the Congress were Chester H. Gray of the American Farm Bureau Federation, Washington, D. C., and Grover C. Dillman, head of the Michigan Highway Commission. Mr. Gray made a forceful plea for the building of secondary roads as an aid to the farmer in delivering his crops to market at the lowest possible cost. Mr. Dillman described the work Michigan has done in the preparation of traffic surveys as a means of determining the location and type of construction needed for highways.

THE Congress summed up its plans and policies in a series of 23 resolutions which represent the painstaking efforts of a group of willing workers drawn from all lines in the building field. The resolutions point out the gravity of the present emergency and are firm in their declaration that the construction industry must lead the country, as well as the entire world, out of the morass of despondency and depression. Prominent in the resolutions was, of course, the admonition to the various state legislatures that diversion of gasoline taxes and motor license fees must stop if the country's most stable industry—road building—is to go on. Liberalization in the lending of emergency relief funds for construction purposes was strongly urged and public works must not be undertaken without first planning such projects with extreme care, the Congress opined. Strongly opposed to the dole, either directly or indirectly, it was resolved that much more good could be accomplished by hastening the release of public funds for general construction and road building, since more than 90 per cent. of the money thus expended finds its way into the pockets of the worker, actually and honestly earned. A firm stand was taken on the continuance of federal aid for state highway improvement, it being urged that the sum appropriated each year be in no case less than the revenues obtained from federal taxes on gasoline, oils, tires and motor vehicles. The emergency general sales tax was recommended to the several states as a means of spreading the cost of unemployment evenly.

THERE was talk in some quarters of turning the future of the Highway and Building Congress over to the Construction League of the United States but this was later abandoned and the Congress organization, composed of the heads of the score or more associations participating in the affair, will remain intact. Just what its future will be will be determined in large measure by what the first Congress accomplished. If the platform of the construction industry, as embodied in the resolutions, is carried out, its success is more than assured. If those who attended fail to carry on its aims and purposes throughout the year, little if any good will have been accomplished. The resolutions are printed in full herewith.

RESOLUTIONS

1. *Opposition to the Dole*—We are unalterably opposed to the dole system and strongly advocate in lieu thereof, first, an immediate constructive program of sound and needed public and semi-public improvements, and, second, the adoption of such measures as will hasten the resumption of private construction and industry. Among the public and semi-public projects are highways, waterways and other forms of transportation; flood control; housing; sanitation; waterworks; sewerage and refuse disposal; public buildings and other similar projects.

2. *Government Economy*—We demand maximum economy in the current administrative and operating expenses of government, as well as an increased program of public works financed out of capital account. To further this end we urge that wherever possible, the investment of the national government, states, cities and other governmental subdivisions in permanent improvements be charged into capital account as is the practice of private industry, and that only the necessary carrying charges and amortization be included in current operating budgets.

3. *A Liberalized Relief Act*—In view of the ineffectiveness of the construction loan operations that have been carried on under the Emergency Relief and Construction Act, we advocate liberalization of self-liquidating requirements and reduction of interest rates by suitable amendments of that act.

4. *Sewage Works*—We appeal to states and municipalities to enact immediately legislation that will place upon a self-sustaining and self-liquidating basis through service charges such public services as sewerage and sewage disposal.

5. *Construction Funds*—We urge that all public agencies engaged in distributing relief funds adopt the policy of applying these funds wherever possible through planned useful work instead of through welfare doles.

6. *Emergency Federal Aid*—We urge the extension of the date of completion of current emergency Federal Aid highway work from July 1 to October 1, 1933.

7. *Continue Federal Aid*—We deplore the proposal that Federal aid to state highway improvement be curtailed or suspended at this time, and we urge Congress to continue the Federal-aid policy by appropriating during the present emergency a sum equal to that appropriated last year, and in any event not less than the revenues from Federal taxes on gasoline and tires.

8. *No Diversions*—We demand that the revenue raised from motor vehicle fuel taxes and license fees be used exclusively for highway construction and maintenance, and we oppose the diversion of these fees and taxes to other purposes.

9. *Street Construction*—We advocate the extension of Federal aid to those portions of state and Federal-aid highway systems within city limits, and we recommend such allocation as will give a fair proportion of the highway funds to municipalities for streets and roads within their corporate limits.

10. *Traffic Regulation*—We endorse the proper and reasonable regulation of highway transportation, such regulation to be premised on sound economics and not on a desire to establish parity of cost with other forms of transportation.

11. *Housing*—We urge that all necessary measures be undertaken to promote the construction of adequate low-rental housing and that the various states enact legislation to grant the power of eminent domain for this purpose.

12. *Lower Interest Charges*—Believing that the heavy interest charges of fixed obligations are a serious obstacle to early credit restoration, we urge, as an essential of economic recovery, that interest rates on such fixed obligations be reduced and adjusted by negotiation to conform to the general price level.

13. *Revise Bankruptcy Laws*—We recommend that the Federal government and the several states amend their bankruptcy and related statutes to simplify the process of reorganizing public and private financial structures by providing that approval of a substantial majority of bond or other certificate holders shall be sufficient to authorize such reorganization.

14. *Taxpayers' Relief*—We urge that state laws and municipal charters be amended to permit deferring payment for at least two years of the initial installments of special assessments upon benefited property without penalty and at moderate interest.

15. *Mechanics Lien Law*—We endorse the Uniform Mechanics Lien Act prepared by the Standard State Mechanics Lien Act Committee of the United States Department of Commerce and the National Conference of Commissioners on Uniform State Laws, and urge the enactment of this legislation by state legislatures.

16. *Reduce Government Functions*—We urge that the Government cease engaging in any form of business and service not clearly necessary to the administration of governmental functions.

17. *Public Works*—We urge that the United States Congress establish a national department of public works.

18. *Congressional Committees*—In view of the vital relation of construction to public welfare, we urge that standing committees on construction be set up in both branches of the Congress of the United States, similar to those of agriculture, finance, etc., so that Congress may be enabled to act with greater knowledge and broader judgment on construction matters.

19. *Planning of Improvements*—Believing that public and semi-public works can be carried out efficiently and economically only under a coordinated and balanced program of national, state and municipal works, we urge comprehensive advance planning of public improvements accompanied by long-term financial planning as the soundest policy of conducting public works; and we recommend that legislation to carry out such policy be enacted.

20. *Sales Tax*—We favor the enactment of an emergency general sales tax as a means of reducing other forms of taxation and furthering the program of public and semi-public improvements that we advocate.

21. *Construction Currency*—We recommend that if further financial measures are found necessary to restore employment and value, consideration be given by Congress to the establishment of a rigidly controlled increase of circulation by issue of currency based on labor and materials actually expended in useful construction, such currency to be issued only as compensation for work completed.

22. *Rehabilitation and Repair*—To give more immediate aid to the unemployed, we urge all communities to plan and put into effect an intensive campaign of rehabilitation and repair.

23. *Hand Labor*—While recognizing the urgency of reducing unemployment, we demand that public work be performed by the most modern and efficient methods, and we oppose the indiscriminate substitution of hand labor therefor.

Crushed-Stone Producers Discuss Plans to Combat Wayside Competition

Discuss Problem Jointly with Gravel Men at Detroit; Worthen Reëlected President

UPS and downs of the crushed-stone industry during the year just passed were thoroughly digested at the annual convention of the National Crushed Stone Assn. at Detroit, January 16-18, and many producers are looking forward to the approaching season with optimism. What the convention may have lacked in attendance as compared with former years it made up for in enthusiasm and an earnest desire to get down to fundamentals. Business has not been good. That was admitted. But by keeping a watchful eye upon costs, employing initiative and going after what business there is to be had, the industry feels that it can struggle along until that time, not far distant, when pent-up demand for construction materials is certain to be released.

REPORTS of the 34 directors on business conditions and prospects in their districts provided an interesting picture of the condition of the industry. Although only about half of the directors were present to read their reports many unable to attend sent in their reports which were read to the assembly.

Production in 1932 varied in different sections of the country from 15 to 50 per cent. less, and averaged from 30 to 35 per cent. less, than in 1931, the reports brought out. These conditions did not exist in any particular sections but prevailed everywhere, in contrast to 1931 when some sections had not yet seriously felt the effects of curtailed business. Very little railway ballast or agricultural limestone was sold, as might be expected from the reduced incomes of railways and the farmers. Building construction was again lower than in the preceding year and most producers got the bulk of their business from highway construction and maintenance programs. In some sections of the middle-west and in the southwest competition from portable and roadside plants was felt severely.

Prices held up well considering the intensified competition due to the reduction in business, the greatest reported decrease being 25 per cent. One operator stated that prices were back to the level of 1907. In the southwest prices were said to be improving somewhat and the consensus of opinion was that they should improve in most sections during 1933. No "price wars" were reported and it is evident that producers are finally refusing to lower their prices to a point below the actual cost of production in order to obtain business at any price. This in itself is a favorable indication for the future.

It is significant that many of the producers reported that they were able to keep operating costs per unit of production at or near the levels of previous years despite curtailed production and, in some cases, costs were reduced even below the levels of previous years. One large operator in the east was able to lower costs 35 per cent. by careful management and by operating only as many plants as could economically serve his territory. Selling costs showed little reduction, however, due to the fact that most producers kept their sales efforts at the same levels as in more prosperous times.

Reports on the prospects for 1933 varied considerably in different territories but the consensus of opinion was that business would be at least as good as in 1932 from present knowledge and that developments in many sections may result in a decided improvement. Much emphasis was laid on the fact that one of the most effective means of improving conditions in the crushed-stone industry is to prevent the diversion of gasoline taxes.

GEORGE E. MAC ILWAIN, business economist and analyst, who has addressed a number of crushed-stone conventions during the past ten years, declared, in an address, that business conditions have assumed more normal proportions during the past few months although on a lower scale than that to which we have become accustomed. This year will show some improvement, as well, establishing a new normal capacity. Hard work and concentration are necessary and a thorough house cleaning in most industries has put them in a position to show profits at 50 per cent. lower capacities than was formerly possible.

Maurice Holland, director, Division of Engineering and Industrial Research of the National Research Council, in his paper *Research—Industrial Insurance,* said that companies leading in research activities are usually the most successful. He recommended that even the smaller producer do at least some research work and declared that research on the characteristics of various types of stone and the stabilities of bituminous mixtures were especially important at the present time. He made an eloquent plea that producers continue to back up the important work being done by the association along these lines.

E. M. FLEMING, manager of the Highways and Municipal Bureau of the Portland Cement Assn., discussed the *Cement-Bound Macadam Road.* He briefly reviewed the history of this type of road from its development in 1870 to the present declaring that it is again becoming popular because of its comparatively low cost. Mr. Fleming recommended specifications for aggregates for this type

of road and the methods and quantities of materials to be used in its construction. According to Mr. Fleming the biggest problem now confronting the industry is the increasing diversion of road funds to other uses. He stated that in 1931 about $20,000,000 was thus diverted, that this amount jumped to $140,000,000 in 1932, and that from present indications 1933 would be even worse.

In the discussion which followed, J. H. Bixby, district engineer of the New York State Highway Dept., told of the use of cement-bound macadam in his state. He recommended that only clean stone be used and that one of the chief difficulties in laying this pavement could be overcome by the addition of small quantities of hydrated lime to make its finishing easier. He illustrated his talk with a number of slides which showed the methods used in New York State. According to Mr. Bixby, this type of pavement is costing his state only about one-half as much as concrete but does not have quite as smooth surface. It is not recommended for other than secondary roads, he said.

Further discussion took place on the sandwich-type bituminous roads using temperature-resisting cement. This material, commonly known as T.R.C., was developed several years ago in Europe and is now becoming popular in this country. It was said that this type of road can be built at a low cost and develops a strength within 5 per cent. of that of a comparable concrete pavement.

Fred Swineford, chief engineer of the Ohio Crushed Stone Assn., discussed *Use of Crushed Stone for Widening Highways.* Roads are being widened with crushed stone mixed with from 3 to 5 per cent. of bitumen, while surface treatment methods are being used on several hundred miles of old high-crowned narrow roads. This allows parking off the road and reduces the danger of accidents due to soft shoulders and reduces shoulder maintenance as well.

GEORGE D. BAILEY, partner of Ernst & Ernst, who talked on *The Readjustment Era—Its Relation to Plant Value* at the Tuesday morning session, advised readjustment of plant values only when the present valuation is not in keeping with the trend of the times. A plant built during the boom should be revaluated while one built before that time might not need revision. Mr. Bailey discussed in detail many of the factors which must be considered in obtaining a fair plant value.

The discussion that followed was led by Wm. Hilliard (New Haven Trap Rock Corp.), who said that the writing down of assets does not affect the financial standing or interest of the stockholders, since the value of a share of stock depends on its earning power. Some of the factors he stated that must be recognized in writing down plant valuation follow:

1. The excessive plant capacity beyond what is necessary to meet the normal demands or trends in the individual business and the industry.
2. The excess capacity in the industry as a whole, and the relative position of the company within the industry.
3. The trends in style of product that will affect the useful life of the present assets.
4. The cost of replacement, based on lower price levels for material and labor represented in the assets.
5. The development and improvement in design for machinery and equipment used in production. Although business has been very slack in most lines in the last few years, a great deal of progress has been made in the direction of improving design for machinery and equipment. This tends to hasten obsolescence and shorten the useful life and value of present assets. This improved equipment will find its way into the hands of companies who are able to buy it.
6. Excessive state and local taxes resulting from the use of fictitious book values.
7. Earning power of assets, such, for instance, as the future rental income of dwellings owned by a corporation and rented to its employees. The rental, of course, now and in the immediate future will be substantially less than such a company has been obtaining in the recent past.
8. Changes in production, quality and manufacturing processes. Some companies in the past have hesitated to write up their assets for the reason that it might cause them to pay higher local and state taxes. Conversely, at the present time, if a company's assets might justifiably be written down, it might help in obtaining lower local and state taxes. Finally, some insurance companies have refused the risks and consequently the premiums in cases where assets have been written down. This is, of course, consistent, as in adjusting claims for losses they base their settlements on current values and not on the original costs.

F. H. JACKSON, senior testing engineer of the U. S. Bureau of Public Roads, addressed the operators on *Standardization of Sizes,* a subject which he first discussed before the crushed-stone producers in 1920. He said that not as much has been accomplished as expected along this line because of the lack of a mandatory specification as a basis from which local specifications can be drawn up. The biggest step forward that has been made is the specification of the Federal Specification Board, of which he is chairman, which is mandatory for all government work. He recommended two basic groups of five sieve sizes each for hard and soft aggregates and suggested that the smallest possible number of intermediate sizes be used with these. According to Mr. Jackson, the work of his organization and of the associations along this line is at last producing results and should be of considerable benefit to producers.

In a discussion of this paper, R. R. Litehiser, chief engineer of the bureau of tests of the Ohio Dept. of Highways, said that his state was coöperating to the greatest possible extent and that more than half the aggregates used in Ohio are now being tested over square-mesh sieves in accordance with recommendations and that soon all of it would be.

A. T. GOLDBECK, director, Bureau of Engineering of the association, departed from his usual custom of presenting a dry but meaty discussion of the technical progress made under his direction. In his paper *How the Bureau of Engineering Helps the Crushed-Stone Industry* Mr. Goldbeck took stock of the importance of trade organizations to their industries and of the value of the work of his department to the crushed-stone industry. In a brief but concise review of the history of his department since it was established in 1925 he showed that it has returned to members of the association many times what it has cost, in the form of services and information which they could have obtained from no other source.

One of the first problems to overcome, he said,

was the prejudice in some sections against the use of crushed stone in the construction of concrete highways, because the high percentage of voids due to the angularity of the material often resulted in poor workability. Work by the bureau on the effects on concrete of the bulking of moist sand helped to improve the workability of such mixes and greatly increased the extent of their use for this type of work.

Publication of researches on the importance of beam strength in concrete and the effect of flat and elongated aggregate particles have also helped the industry to utilize advantages and overcome prejudices which it could not otherwise have done, Mr. Goldbeck pointed out. Work on the use of crushed stone in the construction of bituminous macadam and mixed-in-place bituminous types of pavement now rapidly growing in favor has resulted in the crushed-stone industry getting a good share of this business.

Research on the stability of crushed stone due to its angularity have won it preference for ballast and for mixed-in-place types of highway construction, Mr. Goldbeck declared. He closed by pointing out that the present increased competition with other materials due to decreased demand and the growing menace of roadside plants made the association more of a necessity now than in normal times. Many other problems also need attention and, according to Mr. Goldbeck, the association is now better fitted to serve the producer than ever before in its history.

GILBERT H. MONTAGUE, New York attorney, speaking on *Stabilization and Anti-Trust Laws*, reviewed briefly his talk of the previous year on the same subject and then quoted decisions of the Supreme Court which show that thought is turning toward the restriction of expansion in industries whose capacities are already far in excess of requirements. According to Mr. Montague, the Sherman anti-trust law does not fit present business conditions and decisions are now pending in the Supreme Court as to whether or not associations can get together and agree on competition, prices, etc.

Attorney Harold Williams brought out the fact that much of the unfavorable sentiment against the repeal of the anti-trust law is due to unsound proposals which have been made without provision which would protect all concerned from the abuse of privileges. Repeal of this law, he said, would not bring immediate prosperity but would allow the industry to take measures against a similar collapse in the future.

IT was announced by the chairman that, due to the similarity of problems and papers on these subjects the remainder of the program for Tuesday afternoon would be in the form of a joint session with the National Sand & Gravel Assn.

The Development of Wayside Plants, presented by A. T. Goldbeck, pointed out the growth of such plants and the fact that they were scarcely noticed while business was good but that they have become of great importance in recent years. He mentioned some of the trends in transportation and types of

NATIONAL CRUSHED STONE ASSOCIATION
1933

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road surfaces which have encouraged the use of local materials. From 4 to 5 times as much wayside gravel as local crushed stone is being produced, he said. Since little of this material is shipped by rail, he pointed out that both permanent-plant operators and the railroads could benefit materially by rate reductions to certain points, temporarily if necessary. He cited a number of reasons why the permanent plant should be preferred to wayside plants and made a number of suggestions as to methods of competing with them.

Stanton Walker, director of the Engineering and Research Division of the National Sand & Gravel Assn., pointed out that the portable-plant operator is not confined as closely to specifications as the operator of a permanent plant and that he takes advantage of research which is paid for by the latter. Mr. Walker went to some length to detail the advantages of the permanent plant over the portable to the aggregate user. Chief among these were the stability of employment, tax returns, a superior quality of material, reliable service, etc. That highway officials recognize the limitations of portable plants is also evident from the restrictions many of them place upon this type of operation.

John Prince (Stewart Sand & Material Co.) described the plan which has recently been put into effect in Missouri through an agreement between the sand, gravel and crushed-stone producers, ten railways in the state, and the state highway department. This plan enables permanent-plant operators to ship materials at reduced rates for highway work so that they can compete for business which they formerly had to concede to portable operators. The state profits by having a steady supply of high-grade material at lower cost and through other benefits which can not be accurately estimated in money value. The railroads profit through the revenue freight created, since little, if any, of the material produced by portable plants is shipped by rail. This movement, it was brought out, was started by the producers and its legality has been supported by the state's legal department. Additional discussion, participated in by a number of producers, emphasized the necessity of immediate action to prevent further loss of business to portable plants and brought out the different ways in which this competition is being met in different parts of the country.

A DISCUSSION of measures being taken in various states to prevent diversion of the gas taxes was one of the high spots of the gathering. In several states legislation against diversion is being sought, in another a general sales tax is being considered and will prevent diversion if passed, and in still others motor clubs, business-men's associations and others, have joined to protest and work against diversion.

Scott Turner, director of the U. S. Bureau of Mines, commented on the completion of seven years of organized safety work in the crushed-stone industry and on the fact that the past two years especially showed impressive decreases in accident frequency as a result. Of the 61 member companies entered in this competition during 1931, 16 had no lost-time accidents and awards had to be made according to the volume of exposure in the various plants. The Martinsburg, W. Va., quarry of the North American Cement Corp. was the winner of the *Explosives Engineer* award which was received by A. R. Couchman, safety director of that plant. Mr. Couchman briefly told how this record was achieved and emphasized the value of safety hats, shoes, belts, goggles and other similar appliances.

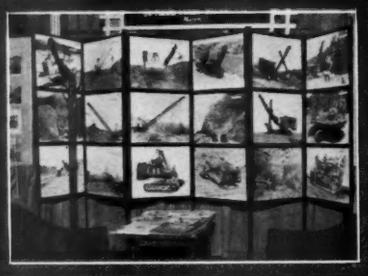
Dr. F. W. Lee, supervising engineer of the Geophysical Section of the U. S. Bureau of Mines, gave *A Progress Report on Development of Apparatus for Measuring the Intensity of Ground Vibrations Resulting from Quarry Blasting.* He described studies which have been made of various types of vibration to form a basis for comparing the intensity of blast vibrations. He also exhibited seismometric records which were developed under his direction to accurately record vibrations. As this problem is of vital interest to many producers the discussion was quite active and Dr. Lee was called upon to answer a number of questions on this subject.

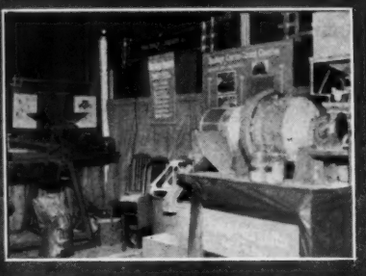
EXHIBITORS AT JOINT EXPOSITION

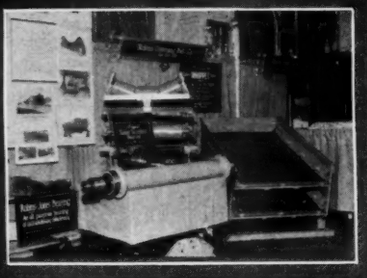
Detroit, January 16-20, 1933

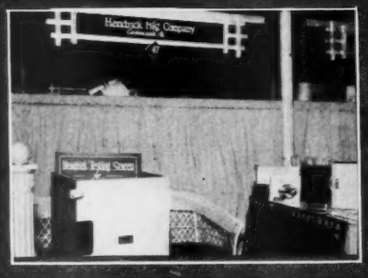
NATIONAL CRUSHED STONE ASSN.
NATIONAL SAND AND GRAVEL ASSN.
NATIONAL READY MIXED CONCRETE ASSN.

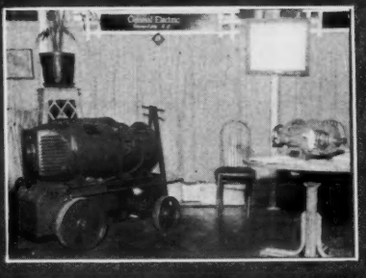
Allen-Sherman-Hoff Co.
Philadelphia, Pa.
Allis-Chalmers Mfg. Co.
Milwaukee, Wis.
American Manganese Steel Co.
Chicago Heights, Ill.
Blaw-Knox Co.
Pittsburgh, Pa.
C. G. Buchanan Co.
New York, N. Y.
Bucyrus-Erie Co.
South Milwaukee, Wis.
Burton Explosives, Inc.
Cleveland, O.
Cross Engineering Co.
Carbondale, Pa.
Crucible Steel Co.
New York, N. Y.
E. I. du Pont de Nemours & Co.
Wilmington, Del.
Eagle Iron Works
Des Moines, Ia.
Frog, Switch & Mfg. Co.
Carlisle, Pa.
General Electric Co.
Schenectady, N. Y.
Hardinge Co.
York, Pa.
Hendrick Mfg. Co.
Carbondale, Pa.
Hercules Powder Co.
Wilmington, Del.
Jaeger Machine Co.
Columbus, O.
Kennedy-Van Saun Mfg. & Engr. Corp.
New York, N. Y.
A. Leschen & Sons Rope Co.
St. Louis, Mo.
Link-Belt Co.
Chicago, Ill.
Ludlow-Saylor Wire Co.
St. Louis, Mo.
Manganese Steel Forge Co.
Philadelphia, Pa.
Marion Steam Shovel Co.
Marion, O.
Morris Machine Works
Baldwinsville, N. Y.
Niagara Concrete Mixer Co.
Buffalo, N. Y.
Nordberg Mfg. Co.
Milwaukee, Wis.
Ohio Power Shovel Co.
Lima, O.
PIT AND QUARRY
Chicago, Ill.
Robins Conveying Belt Co.
New York, N. Y.
Rock Products
Chicago, Ill.
Sauerman Bros., Inc.
Chicago, Ill.
Simplicity Engineering Co.
Durand, Mich.
Taylor-Wharton Iron & Steel Co.
High Bridge, N. J.
Thew Shovel Co.
Lorain, O.
Traylor Engr. & Mfg. Co.
Allentown, Pa.
Troco Lubricating Co.
Philadelphia, Pa.
W. S. Tyler Co.
Cleveland, O.
Universal Crusher Co.
Cedar Rapids, Ia.
U. S. Bureau of Mines
Washington, D. C.

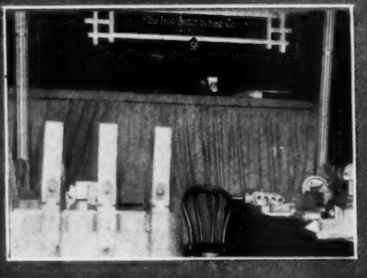


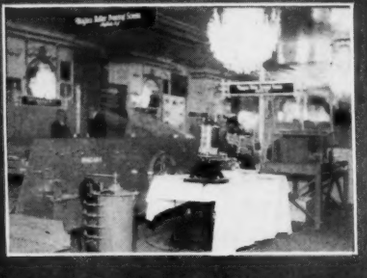


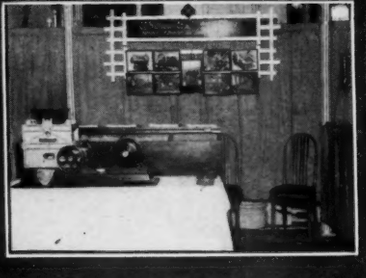


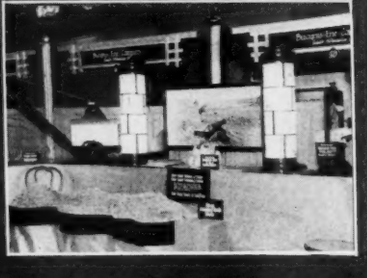


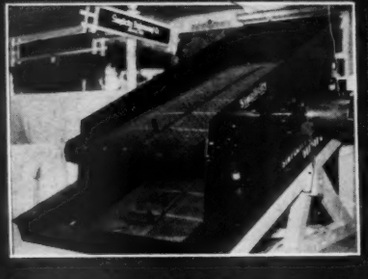












Equipment Exhibits

Marion	Traylor	Hardinge
Robins	Robins	Hercules
Hendrick	General Electric	Frog, Switch
Nordberg	Thew	Niagara
Ludlow-Saylor	Buchanan	Bucyrus-Erie
Simplicity		Leschen

Producers of Premixed Concrete Discuss Technical, Marketing Topics

Operating Conditions Studied at Third Annual Convention of Group at Detroit

WHEN J. L. Shiely rapped his gavel on the morning of January 18, calling the third annual convention of the National Ready Mixed Concrete Assn. to order at the Book-Cadillac Hotel, Detroit, he found a representative group of leaders in the industry present, eager to get down to business. These producers have helped firmly establish an industry that but a few years ago was practically unknown, and they tackled the problems confronting them with the thoroughness and ability which has characterized their efforts since the beginning of the premixed-concrete business.

H. F. Thomson (General Material Co.) opened the convention with a discussion of *"What the National Ready Mixed Concrete Ass'n Means to the Industry.* He reviewed the accomplishments of the Association during its brief existence and what it has saved the industry, going on to detail the existing need for even more extensive engineering and research information. An encouraging note was his statement that, although business declined considerably during the year, the industry has been getting a steadily increasing percentage of the total amount of concrete placed. Overproduction, said Mr. Thomson, is already a problem in the industry in some sections and should receive serious consideration. He closed his talk with a summary of the functions of the association.

A PAPER, *A Purchase Specification for Ready Mixed Concrete,* was read by Stanton Walker in the absence of R. B. Young, who was scheduled to continue the discussion of this subject begun at the convention at Pittsburgh the previous year. This specification was proposed by a sub-committee of the American Society for Testing Materials, of which Mr. Young is chairman, and is being submitted for comment. It will again be presented to the A. S. T. M. after further revision. The specification is being prepared with a view to avoid confliction with a similar instrument being prepared by the American Concrete Institute.

Some of the factors which are taken into consideration in the preparation of this specification were outlined. Among the more important of these are the accurate measurement of mixing water, provision for accurate control of mixing time, measurement of coarse aggregate by weight, and fine aggregate by weight, or by volume, using the inundation method. Provisions are made for the use of high-early-strength cement, for five different methods of proportioning concrete, and for the use of admixtures which must be measured by weight or volume depending on whether they are in powdered or liquid form. The specification will also include a definition of dry and rodded volume of aggregates, a maximum percentage of fine aggregate for concrete, a limit in hauling time after the discharge of water into the mix, and maximum and minimum discharge temperatures. A minimum amount of cement may also be specified to insure durability of all concrete produced. Testing of the concrete and provisions for retesting are also being considered.

H. P. Chapman, assistant director and chief engineer of the Ohio State Highway Dept., was scheduled to talk on the *Use of Ready Mixed Concrete in Highway Construction,* but in his absence the paper was read by E. D. Moyer, planning engineer of the department. This subject is of vital importance to producers as it forms a potentially large and comparatively undeveloped market for the use of ready-mixed concrete. The experience of the Ohio department has been very satisfactory with this material which has been used to a considerable extent on road-widening projects. With the perfection of equipment which will allow full-width pavements to be laid economically with this material, its field in highway construction will be considerably enlarged.

Miles N. Clair, of the Thompson & Lichtner Co., discussed the *Use of Ready Mixed Concrete in Cold Weather.* He brought out the fact that heating of the mixing water is usually sufficient when the temperature is above the freezing point, but for lower temperatures, all materials must be heated in order to get concrete of 70 deg. or over. He advised accurate control of the mixing water temperature and pointed out the disadvantages of heating the mixture with torches or steam. The possible use of

(*Continued on page 52*)

NATIONAL READY MIXED CONCRETE ASSOCIATION 1933

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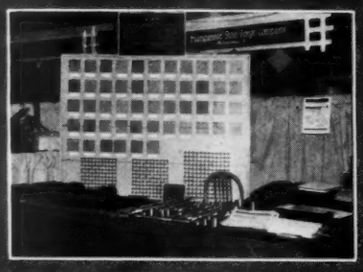
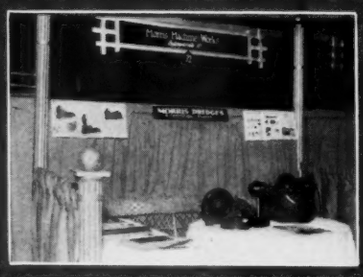
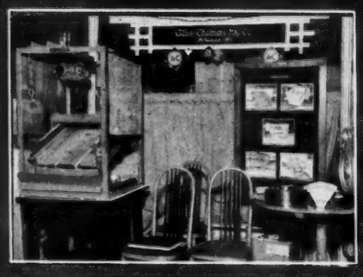
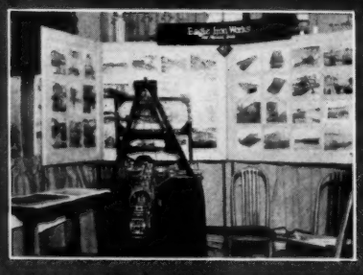
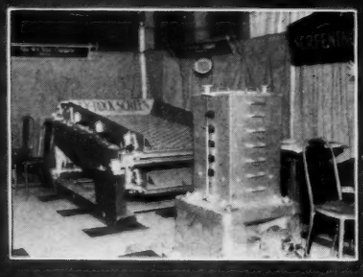
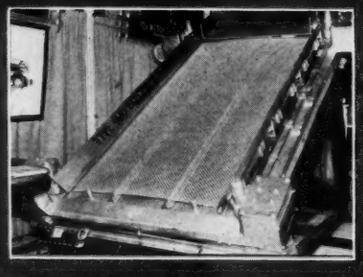






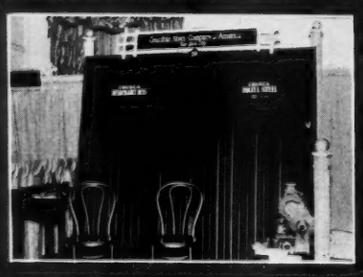






Equipment Exhibits

Manganese Steel	Ohio Power Shovel	American Manganese
Du Pont		Allis-Chalmers
Kennedy-Van Saun	Morris Machine	Eagle Iron Works
Universal	Cross	Blaw-Knox
Sauerman	Link-Belt	Tyler
Allen-Sherman-Hoff	Tyler	Crucible Steel



Plans for Road Construction Brighten Outlook for Gravel Producers

Discuss Marketing Problems and Trends in Production at Convention in Detroit

BY pointing out the great importance of the diversion of gasoline taxes to the future of the construction industry H. V. Owens, president of the National Sand & Gravel Assn., opened that organization's seventh annual convention at Detroit on January 17. In his characteristically quiet, modest, yet convincing way he gave his audience an accurate picture of the ravages of tax diversion and what is probably as fair a preview of coming conditions as anyone could offer. For both tasks he is exceptionally well fitted, since as chairman of the executive committee of the New York State Construction Council he has had unusual opportunities to observe the way in which gasoline-tax funds can be raided by legislative action even though the law creating such taxes specifically provides that they shall be used for road work only.

Politicians have false ideas of economy, according to Mr. Owens. They discharge employees and curtail work on projects which provide employment, although they see the disastrous effects on business of reduced buying power, and then disburse public funds for unemployment relief. Our lawmakers should be educated in sounder fiscal methods. They must be shown the national economic importance of construction work as a balance-wheel of employment, especially at times when unemployment is unusually high. He said that public improvements should be planned by decades and not by months and years.

In Mr. Owens' opinion trade associations are of their greatest value in times like these, and, therefore, their memberships should be greatest now. He deplored the existence of large groups of producers who share the benefits of trade-association work, yet refuse to support it with either effort or money. He likened them to the parasite whom Ed Wynn described as "the guy who goes through a revolving door on the other fellow's push." Mr. Owens pleaded not for his own association only but for all trade organizations and made clear his opinion that every man who expects to continue in business must "do his bit."

In his review of the sand-and-gravel association's accomplishments he mentioned the fact that gravel is now recognized as a first-class ballast material by practically every railroad. This favorable change in attitude he attributed to the work of Stanton Walker, director of the association's Engineering and Research Division. Such work, although of material advantage to every one of the country's thousands of gravel producers, is being paid for by the 72 concerns who comprise the national association's membership.

THE reports on business conditions presented by the association's directors were very like those of a year ago, the chief difference being that they disclosed a somewhat more gloomy state of mind due to the continued decline of building activity in 1932 and to the increasing diversion of gasoline-tax funds to non-highway purposes. The latter fact seems to have colored their views of the outlook for 1933, which do not show as general a feeling of optimism as prevailed at the preceding convention. It was unfortunate and certainly significant that, of the six reports presented, three referred to southern markets and one to a Canadian market, and that the two which dealt with conditions in the Great Lakes region were the most optimistic of all. As a result, the reports are undependable guides to general conditions.

It was obvious that, of the industry's three major markets for sand and gravel, the building industry had suffered most severely. In one district building permits had fallen from $6,000,000 in 1930 to $200,000 in 1932, the latter including one government building which, the speaker declared, "the contractors built and the producers paid for." In another city permits had declined from $54,000,000 in 1931 to $5,000,000 in 1932. In yet another metropolitan market the 1932 demand was but a fourth of that of 1931. Another director estimated building activity in 1932 at 50 per cent. of the 1931 figures, and another said that 1932 business was 30 per cent. of that of peak years and 45 per cent. of that of 1931. In another district construction in 1932 was only 52 per cent. of that in 1931. Speaking of general demand, one speaker stated that consumption in his territory had been 7,500,000 tons in 1929 but only 1,500,000 tons in 1932.

Highway work continues to be the bright spot, in spite of local difficulties. In one important district highway building was reported as "holding up"; in another as promising much due to a plan by which the state, through R.F.C. help, will furnish the labor and the counties will supply the materials, the two agencies pooling their means and cooperating in a state-wide program. In several districts local producers of the wayside variety have been making profitable production almost impossible. In one this problem has had less serious effects owing to the highway department's policy of dividing the available business among all producers irrespective of their size. In another the

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1933

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difficulty has been intensified by the highway department's toleration of poor quality from the irresponsible producer as contrasted with its insistence on good quality from the established producer by whom it has been trained to expect a better product.

In Michigan in recent years the average annual state income from the 3 c. gasoline tax has been $20,000,000 and a like amount has been received from the weight taxes. This year the total will probably not exceed $38,000,000. Prior to 1932 one-half of the weight taxes went to the counties, but now they get the entire amount plus $2,500,000 for township roads from the gasoline-tax fund. Eight and one-half per cent. of the total, or $3,500,000, will be spent for new construction in 1933. By application of the counties' share to bond retirement property taxes have been cut 68½ per cent.

In 1932 the total of gasoline-tax and license revenues in New York was $93,000,000, of which $19,000,000 was given to the state's metropolis and the counties, while $52,000,000 was diverted to other uses. The remainder is less than one-half of the states' road expense in 1931.

In one district there is a growing tendency toward the use of crushed gravel for railroad ballast. In all districts the complaint is that the railroads are buying very little ballast of any kind, following, as strictly as they can, a policy of deferring maintenance. In one district a single producer who sold 500,000 tons of ballast in 1929 sold only 40,000 tons in 1932.

Competitive conditions, especially in so far as they are related to price-cutting, have improved only a little. Although there are many places where this phase has shown betterment, those directors who reported at the convention had not apparently seen an improvement in their districts. One reported a one-third decline in prices in 1932, products that sold for 90 c. a ton in 1929 having brought only 60 c. last year. Another director reported a 25-per cent. drop due to lack of volume. In another district, where the entrance of a new competitor into the field gave fresh impetus to the downward trend of prices, the resulting competition was described as "bad." In another district a large plant built in 1931 has not operated to any great extent owing to its erection on a poor deposit—an example of the lack of care in preliminary investigations shown by too many newcomers when entering a field already overcrowded. Another director, speaking of competitive conditions, said "they could not be worse."

One speaker referred to the threat to business security presented by local pits. Last year local operators worked throughout the state and, so, offered competition to all established plants. The railroads reduced their freight rates to help enable the permanent-plant operators to meet the competitive situation thus presented.

ON the question of the trend in new-plant construction nothing very helpful was brought out, some speakers ignoring the subject while others spoke rather vaguely on it. One director believes that new plants will probably be smaller but gave no reason for thinking so. Another holds the same opinion because deposits in his territory are widely distributed. Transportation will be accomplished chiefly by motor trucks, in his view.

Production methods have not been greatly changed, if the directors' reports are to be accepted as trustworthy guides, for only two mentioned any alterations of consequence. One referred to the growing use of Diesel engines, while the other dwelt somewhat on the tendency toward the provision of means for intermediate storage, that is, storage between the excavating and the processing operations. This plan is considered especially advantageous where electric power is used. The material can be excavated and stored without running the plant, and the same crew of workmen can

be used for the excavating, storing and the processing phases of production.

PREPARED gravel is good ballast, according to H. R. Clarke, engineer, maintenance of way, Chicago, Burlington & Quincy Railroad, who spoke on the *Prospects for a Ballast Market in 1933*. Half of the ballast used by the railroads in 1932 was prepared gravel, he added. The railroads are deferring their maintenance work and as evidence he cited the facts that, while in 1925 to 1929 the amount spent for purchases of all kinds was 22 per cent. of their revenue, in 1931 and 1932 this had fallen to 16 per cent. Gravel purchases in the years 1925 to 1929 averaged 12,000,000 cu. yd. annually and in the year 1932 they amounted to but 4,000,000 cu. yd. Maintenance-of-way expenses fell 50 per cent. and ballast expenses even more. The deferred maintenance had already reached 5,000,000 cu. yd. last year, even though track and structures have worn more slowly under reduced traffic. A 10-per cent. increase in revenue, the speaker said, would result in an even greater increase in purchases. As a sign of improved business he cited the fact that car-loadings continued their seasonal rise to the third week of October in 1932, although this increase usually ends in the last week of September.

MARKED advantages result from the preinspection of aggregates and these were enumerated by W. J. Emmons, director, Michigan State Highway Laboratory, in his paper on *Plant Inspection of Aggregates Under Modern Specifications*. According to him, preinspection has the following advantages: (1) The material passed will be accepted on the job; (2) it provides an opportunity to correct rejected shipments; (3) it affords the knowledge for doing this; (4) all inspections are alike. With regard to plant inspection he said that, although it is not final inspection, it is of value to the state, the contractor and the producer. The aggregate should be inspected as it is produced. Stock-pile storage is not satisfactory if the piles contain a large variety of sizes. Separated sizes are easy to handle and there is less segregation.

Although the National Crushed Stone Assn. and the National Sand & Gravel Assn. had scheduled the subject of local-plant competition for separate discussion, it was agreed to hold a joint session. The discussion is reviewed in the report of the crushed-stone convention, on page 00 of this issue.

IN leading the discussion of *Marketing Problems in the Sand and Gravel Industry* W. A. Bliss, president, Sand & Gravel Co. of Pittsburgh, described the competitive conditions which resulted in the formation of his company. Within a 5-mi. radius of the center of Pittsburgh about 1,500,000 tons of sand and gravel was sold. The next 5-mi. ring adds 1,000,000 tons and the following one another 1,000,000 tons. To supply this market there are 40 plants, located along 67 mi. of three rivers, two of which, the Allegheny and the Monongahela, join and form the third, all within the city of Pittsburgh. Desiring to reduce their capital expenditure and to avoid duplication of effort, three of the city's producers formed the Sand & Gravel Co. of Pittsburgh, the stock ownership of which is divided among the three companies in proportion to their individual sales in the preceding 5-yr. period. This sales company buys from the stockholding producers and sells in Pennsylvania only, sales outside the state being made by the producing companies direct.

These companies own 5 steel ladder dredges, 145 barges, 8 ordinary and 3 large towboats, and have 18 unloading and distributing plants. Before the formation of the sales company as many as 3 barges would be taken up the same river in a single day to handle material that could have been carried in one barge. A similar duplication of transport occurred in the companies' motor-truck operations. Through consolidated efforts such wastes are either reduced or eliminated.

Delivered prices are based on those of the company which has the lowest freight rates. This plan has resulted in the absorption of $50,000 in freight rates in one year. Delivered prices average $1.05 a ton—$1.23 when shipments are made by trucks and 91 c. when made by barges.

The sales company absorbs all selling, bookkeeping and credit expenses and operates with an organization of 25 persons. Sales amounting to 190,000 tons were made at an expense of $10,000, or at an average of cost of about 10 c. a ton.

V. O. Johnston, president, Lincoln Sand & Gravel Co., Lincoln, Ill., presented an interesting discussion of the difficulties and possibilities of coöperation among competitors. In every competitive situation, according to Mr. Johnston, there are three types of producer with whom it is difficult to coöperate—the selfish man who wants everything for himself, the ignorant man who does not know his costs, and the "downright crook who trims you when he can." Bad as the situation seems, there is a way out. The selfish man can be taught that a smaller output produced at a profit is better than an enormous output at no profit; the ignorant man can be shown how to keep his cost records; and the "crook" can be taught to grow in stature and to aspire to equal his competitors and to acquire the rating of the high-grade business man. Coöperation, said Mr. Johnston, is the easiest way by which to raise prices and so insure profits. Success will depend, however, on "patience, perseverance and persistence."

SPEAKING for William P. Belden, who was unable to attend, Mr. Patten of his staff presented a discussion of *What Revision in Anti-Trust Laws Are Necessary to Permit Economic Planning in the Sand and Gravel and Allied Industries?* He reviewed at length some of the most important decisions based on the Sherman Act, which was designed, he said, to prevent great accumulations of capital in hands dangerous to the public interest. He cited the Standard Oil Co. case as showing that the dissection of the company had not increased the competition in the field, and one of his main contentions was that, even if price agreements were legal, they would not succeed in keeping prices up.

According to court decisions it is evident that trade associations can exchange data on past transactions but can not legally set production schedules, even though it can be demonstrated that an industry is losing money by present unregulated methods. One hundred and thirty-seven bituminous-coal producers, controlling 58,000 of a total of 107,000,000 tons of output, formed a sales agency for coöperative selling. The Department of Justice, to which the plan was submitted for criticism, decided that the agency had the power to affect prices and so was illegal.

The remedy for the law's present defects lies with Congress and not with the courts. The repeal of the anti-trust laws is not practicable just now, in the opinion of the Commerce Committee of the American Bar Assn., because Congress is too deeply absorbed in other problems, but a modification plan may meet with success.

The bar association's proposed bill would enlarge the functions of the Federal Trade Commission. Under it any proposed plan or contract could be submitted to it and to the attorney general and they would give an opinion on it. If it would not injure the interests of either dealers, producers or consumers in the industry involved, it would be declared lawful.

The present laws, said the speaker, cast the shadow of the penitentiary over every industry which tries to better its conditions.

INSTEAD of discussing *What the National Sand and Gravel Assn. Has Saved Its Industry,* the subject assigned to him, John Prince, president, Stewart Sand & Material Co., Kansas City, Mo., referred briefly to the facts that gravel is now accepted as railroad ballast and that it is considered good for concrete roads and then spoke at length on the outlook for the industry. He said that many municipalities are nearly bankrupt and, therefore, in trying to balance their budgets eliminate public work as an unnecessary expense. He believes that the cities are marked off the list as markets for the sand-and-gravel industry's products. The situation with the states is similar, so they are attempting to use every form of available money for unemployment relief. Furthermore, the federal government is planning to cut off public work as a means of balancing the budget. He mentioned the possibility of inflation of the currency as an unfavorable sign. One billion dollars has already been extracted from government agencies for relief purposes, and $300,000,000 has been lent to the states, the repayment of which is guaranteed by mortgaging the highway funds of the future.

PRESIDENT Owens, in closing the convention, said that every state needs a planning commission for public work that is to be built in the public interest. Self-liquidating projects should be studied, and there should be fewer public services offered for free use. He advocated the setting up of from 5 to 10 per cent. as a sinking fund to meet situations like the present one.

He said that there should be constitutional amendments making impossible what happened in New York, where, although the gasoline-tax law specifically provided that the receipts should be used for roads, the legislature passed a law appropriating those funds for relief work.

Premixed Concrete (*From page 47*)

vertical or rotary driers for preheating the aggregates was discussed. Ensuing remarks were centered mostly on the problems encountered in the use of ready-mixed concrete in highway construction.

The afternoon program gave several of the representatives of the equipment manufacturers an opportunity to tell of the equipment being built and developed for laying ready-mixed concrete on highway work.

SEVERAL of the producers present, representing different sections of the country, briefly answered a series of questions on business and operating conditions. The answers indicate that the demand for ready-mixed concrete was somewhat smaller than in 1931 although a larger percentage of the existing business was sold. In some sections increased business was reported. Predictions for 1933 business were for less production in the light of present knowledge, but the prevailing opinion was that the percentage of possible business secured will again be larger, a decidedly encouraging factor for the future of the industry.

Most producers reported no direct competition other than job mixing. In one case producers cooperated to share existing business. The average haul was found to vary from 2 to 5 miles in one direction. The use of ready-mixed concrete for street and highway construction was found to be fairly general, but in one locality this was not true.

Both truck mixers and agitators were widely used, each having its advantages under different conditions. Several operators reported using both types to advantage. It was also found that the sale of concrete on a strictly strength basis was not yet universal although it was admittedly the ideal method. Most of the producers are attempting to promote the use of this method but are finding it difficult to educate users to its advantages.

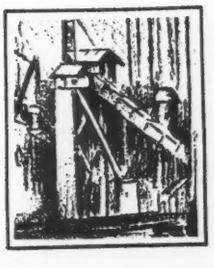
W. D. M. Allan, manager, Cement Products Bureau, Portland Cement Ass'n., predicted *The Future Demand for Concrete,* a subject which was quite timely and received considerable discussion. Mr. Allan pointed out the possibilities of the industry getting a large share of the modernization work which is taking place and advised going after small construction work such as tennis courts, driveways, sewage treatment plants and other similar work. He illustrated his article with slides showing some of the work which could be done. A number of producers present joined in the discussion and told how they had secured considerable business by "door-bell" selling and are depending on this type of work to carry them over until larger business appears.

MEN OF THE INDUSTRY

Blank-Stoller Photo

JOHN L. SENIOR

PRESIDENT of four Portland-cement companies to-day and either chief executive or director of four others in recent years has earned for Mr. Senior his recognized place as a leader in the industry. The concerns he heads at present include Consolidated Cement Corp., Signal Mountain Portland Cement Co., Florida Portland Cement Co., and Trinity Portland Cement Co. Previously he figured in the management of Peninsular Portland Cement Co., Peerless Portland Cement Co., Pacific Coast Cement Co., and Western States Portland Cement Co., the latter plant at Independence, Kan., now a Universal-Atlas unit. He is also president and director of Cowham Engineering Co., engaged in the design, construction and management of cement plants. Mr. Senior lives in Chicago where, in addition to looking after his extensive responsibilities in business and industry, he finds time to take a prominent part in the civic and social affairs of the world's fourth largest city.



Personal Mention

J. L. Crosthwait, manager of Compañia de Cemento Portland "Landa," S. A., Puebla, Mexico, has left that organization, effective December 31, 1932.

Charles Howell of Manhattan, Kan., has set up crushing equipment at Beattie, Kan., and is producing crushed stone for the construction of the Marysville Bridge over Blue River. Motor trucks are being used to transport the material to the construction site.

P. E. Oscarson of Spokane, Wash., is superintending the construction of a plant to produce about 125 tons of vermiculite a few miles east of Libby, Mont. The company is known as Vermiculite & Asbestos Co., and was recently acquired by Chicago interests.

Joseph Riordan, superintendent of the Davenport, Cal., plant of the Santa Cruz Portland Cement Co., spoke before the members of the Santa Cruz Rotary Club recently, describing the manufacture of Portland cement. Motion pictures were shown to illustrate the plant processes.

Nelson E. Chance, formerly district manager of the Houston office of The Brown Instrument Co., has been appointed assistant sales manager, with headquarters at Philadelphia.

Alton J. Blank, general superintendent of Compania de Cemento Portland "Landa," Puebla, Mexico, was recently elevated to the office of Worshipful Master of the Albert Pikes lodge, Master Masons, at Puebla.

Geo. J. Hoffman and **W. J. Angerstein** have filed a bill with the city of Mishawaka, Ind., asking $603 damages which they claim has been suffered due to the city having dumped ashes and rubbish into a gravel pit which they own on the outskirts of the city.

William O. Gish, superintendent of the Wyoming Limestone Co., has taken a 20-yr. lease on a limestone deposit owned by W. W. Hunt near Fort Laramie, Wyo., and has installed crushing and grinding equipment to produce agricultural limestone.

A. B. Fowler, who owns and operates a small limestone crushing plant and quarry at Guernsey, Wyo., plans to resume operations this month, supplying stone to beet-sugar refining plants in that area.

William E. Hausler, president of the Lake Sand Corp., of Chicago, producers of sand dredged from Lake Michigan, has been elected a member of the board of directors of the East Side Trust & Savings Bank in Chicago.

C. S. Mundy, who has operated a crushed stone plant near Delaware, O., for the past year, has recently changed its name to Mundy & Gard, **C. A. Gard** having recently joined Mr. Mundy as a partner in the enterprise. The plant has been modernized and several trucks are used.

Samuel Hadden, secretary of the Indiana Sand & Gravel Assn., spoke on the topic, "Railway and Highway Relations," before members of the Indianapolis Exchange Club at one of its weekly luncheons in January.

Obituary

Wallace F. Blackinton, 45, master mechanic, at the plant of the Union Portland Cement Co., at Devils Slide, Utah, died recently after a week's illness. Death was caused by pneumonia. Mr. Blackinton helped build the Devils Slide plant nearly 20 years ago.

Wendell H. Moulton, superintendent of the Kasota Marble & Tile Co., St. Peter, Minn., died in a hospital there recently after an automobile accident. A fractured skull and internal injuries caused his death six days after the mishap.

Charles A. Bates, city sales manager for the Huron Portland Cement Co. at Detroit, Mich., died recently of pneumonia. He had been ill but a few days. Mr. Bates, who was 58 years old, had been actively connected with the building supply business in Detroit for 33 years. He was a native of New Haven, Mich.

Millard Levan, 30, who supported his parents, two brothers and four sisters in West Mansfield, O., died in a hospital at Findlay, O., recently of injuries received when he was crushed by an engine at the National Lime & Stone Co. quarry in Carey. Both legs and one arm were severed in the accident.

John J. Hartley, western division chief engineer, Link-Belt Co., Chicago, succumbed to death on December 31, at the age of 39, the innocent victim of an assassin's bullets. Mr. Hartley had been connected with Link-Belt's Pershing Road plant, Chicago, for the past 23 years.

Coming Events

February 9, 1933. St. Louis, Mo. Monthly meeting, St. Louis Quarrymen's Assn., Forest Park Hotel. E. J. McMahon, exec. sec., 4063 Forest Park Blvd., St. Louis, Mo.

February 20-23, 1933, Chicago, Ill. Twenty-ninth annual convention, American Concrete Institute. Harvey Whipple, secretary, 2970 W. Grand Blvd., Detroit, Mich.

February 20-23, 1933. New York, N. Y. The 142nd meeting, American Institute of Mining and Metallurgical Engineers, Hotel Commodore. A. B. Parsons, sec., 29 West 39th St., New York, N. Y.

February 21-24, 1933. Wichita, Kan. Southwest Road Show and School. Fred G. Wieland, gen. mgr., Wichita, Kan.

March 26-April 1, 1933. Washington, D. C. Eighty-fifth annual meeting, American Chemical Society.

June 25-30, 1933. Chicago, Ill. Sixth Midwest Engineering and Power Exposition. Chicago Coliseum. G. E. Pfisterer, director, 308 W. Washington St., Chicago, Ill.

June 26-30, 1933. Chicago, Ill. Annual meeting, American Society for Testing Materials, Stevens Hotel. C. L. Warwick, secretary-treasurer, 1315 Spruce St., Philadelphia, Pa.

Latest Portland-Cement Statistics

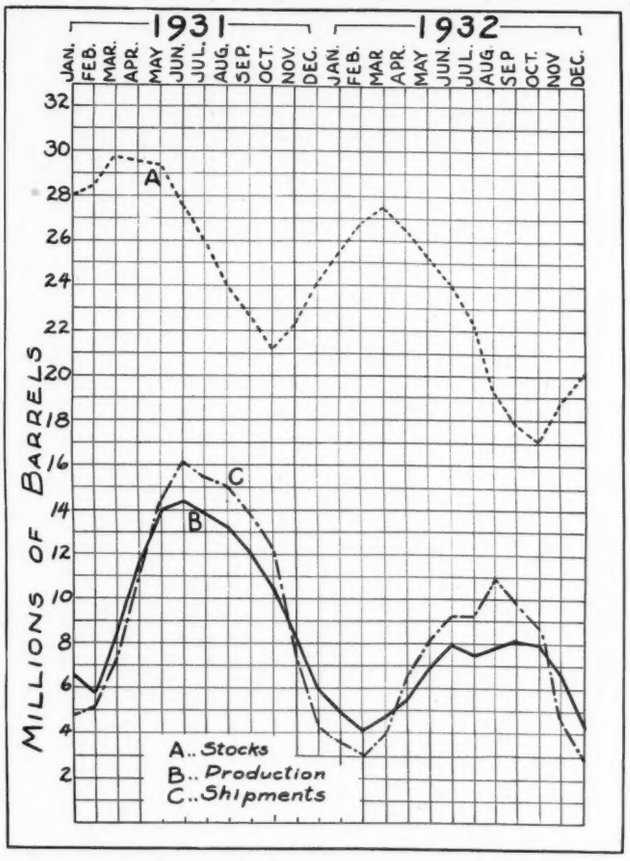

1931
1932
JAN. FEB. MAR. APR. MAY JUN. JUL. AUG. SEP. OCT. NOV. DEC. JAN. FEB. MAR. APR. MAY JUN. JUL. AUG. SEP OCT. NOV DEC.
MILLIONS OF BARRELS
32 30 28 26 24 22 20 18 16 14 12 10 8 6 4 2
A
B
C
A.. Stocks
B.. Production
C.. Shipments

Chart showing monthly production, shipments and stocks on hand at end of month, from January, 1931, to December, 1932.

THE Portland-cement industry in December, 1932, produced 4,248,000 bbl., shipped 2,835,000 bbl. from the mills, and had in stock at the end of the month 20,200,000 bbl. Production of Portland cement in December, 1932, showed a decrease of 28.9 per cent. and shipments a decrease of 31.6 per cent., as compared with December, 1931. Portland-cement stocks at mills were 16.4 per cent. lower than a year ago. Preliminary totals for 1932 show decreases of 39.0 per cent. in production and 36.6 per cent. in shipments from the final totals for 1931. Shipments from mills in 1932 amounted to 80,579,000 bbl. with an estimated factory value of $80,835,000. The statistics here given are compiled from reports for December, received by the Bureau of Mines, from all manufacturing plants except three, for which estimates have been included in lieu of actual returns.

DISTRIBUTION OF CEMENT

Shipped to—	October		November	
	1931	1932	1931	1932
Alabama	50,940	27,450	26,640	46,722
Alaska	808	264	1,634	528
Arizona	27,780	15,107	16,951	11,747
Arkansas	81,767	22,307	65,442	24,462
California	580,258	376,227	469,082	368,806
Colorado	86,048	38,567	38,269	30,044
Connecticut	162,540	71,770	115,392	55,588
Delaware	27,187	26,516	18,165	28,807
District of Columbia	122,498	113,725	95,373	88,796
Florida	51,252	37,713	37,636	31,192
Georgia	162,410	126,372	127,940	96,639
Hawaii	21,468	25,189	21,443	14,050
Idaho	15,481	12,068	9,045	6,095
Illinois	856,580	694,410	405,403	272,348
Indiana	313,599	344,533	137,557	76,993
Iowa	209,676	454,027	75,128	86,539
Kansas	166,235	120,451	85,678	79,749
Kentucky	149,282	228,086	91,585	85,261
Louisiana	485,188	174,155	259,759	108,552
Maine	46,894	27,528	24,207	15,169
Maryland	291,938	140,141	198,274	101,789
Massachusetts	344,866	161,602	229,878	132,313
Michigan	461,985	501,301	191,085	94,471
Minnesota	242,908	232,531	90,893	35,044
Mississippi	23,656	45,566	15,502	42,922
Missouri	482,444	370,436	226,333	153,983
Montana	21,927	16,038	9,526	5,997
Nebraska	194,514	149,984	51,644	49,924
Nevada	18,440	59,278	14,728	61,177
New Hampshire	51,874	52,384	30,201	26,044
New Jersey	645,068	272,420	397,146	178,586
New Mexico	25,380	16,950	11,907	12,752
New York	2,096,119	1,128,337	1,223,494	623,446
North Carolina	59,103	32,846	54,884	30,813
North Dakota	17,110	28,437	6,152	3,590
Ohio	749,570	586,904	371,566	248,100
Oklahoma	174,121	116,502	123,866	119,817
Oregon	91,480	47,454	52,625	19,121
Pennsylvania	781,503	491,038	526,424	376,978
Porto Rico	4,515	9,875	9,238	6,850
Rhode Island	54,139	39,206	35,655	19,367
South Carolina	243,408	14,526	165,616	10,783
South Dakota	29,736	77,355	14,179	6,325
Tennessee	171,232	121,927	128,207	111,559
Texas	542,920	372,878	368,199	363,185
Utah	22,669	26,380	12,860	20,118
Vermont	32,942	17,857	15,714	7,026
Virginia	122,618	72,578	116,823	57,857
Washington	157,064	90,017	71,142	45,327
West Virginia	142,876	72,893	83,257	43,485
Wisconsin	389,339	290,171	153,150	87,968
Wyoming	10,638	10,954	4,891	6,011
Unspecified	9,434	109,019	.....	101,193
	12,325,427	8,712,250	7,127,388	4,732,008
Foreign countries	34,573	30,750	28,612	49,992
Total shipped from cement plants	12,360,000	8,743,000	7,156,000	4,782,000

RATIO OF PRODUCTION TO CAPACITY

	December		November	October	September
	1931 (*per cent.*)	1932 (*per cent.*)	1932 (*per cent.*)	1932 (*per cent.*)	1932 (*per cent.*)
The month	26.4	18.5	29.1	34.6	36.9
The 12 months ended	46.5	28.3	29.0	29.6	30.6

PRODUCTION AND STOCKS OF CLINKER BY MONTHS, IN 1931 AND 1932 (*thousands of barrels*)

Month	Production		Stocks End of Month		Month	Production		Stocks End of Month	
	1931	1932	1931	1932		1931	1932	1931	1932
January	8,129	6,107	10,384	8,184	July	12,246	6,613	10,209	7,889
February	7,473	5,176	11,946	9,375	August	11,664	7,078	8,468	7,175
March	9,586	5,443	13,318	10,025	September	10,414	7,703	6,918	6,708
April	11,540	5,924	13,854	10,511	October	9,825	7,259	6,021	6,093
May	13,159	6,273	13,087	9,922	November	8,259	6,290	6,215	5,938
June	12,679	6,803	11,837	8,877	December	6,840	4,335	7,035	5,996

SUMMARY OF MONTHLY ESTIMATES OF PRODUCTION AND SHIPMENTS OF FINISHED PORTLAND CEMENT WITH ESTIMATED VALUE OF SHIPMENTS IN 1932, BY DISTRICTS (*thousands of barrels*)

Production	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	1932	1931
E. Pa., N. J., & Md.	1,511	1,315	1,509	1,497	1,334	1,389	1,162	1,508	1,606	1,457	1,002	805	16,095	28,640
New York & Maine	279	319	570	537	610	822	809	897	628	486	328	335	6,602	10,309
Ohio, W. Pa., & W. Va.	246	215	241	309	471	645	582	650	792	1,053	757	638	6,599	11,564
Michigan	164	114	53	290	586	544	571	378	524	640	312	153	4,329	6,133
Wis., Ill., Ind., & Ky.	540	515	688	564	821	1,128	1,144	1,211	1,255	1,242	988	477	10,573	15,174
Va., Tenn., Ala., Ga., Fla., & La.	425	290	300	484	718	603	322	379	394	488	680	508	5,591	12,307
E. Mo., Ia., Minn., & S. D.	534	358	325	420	822	1,103	1,143	985	1,039	927	894	422	8,972	12,968
W. Mo., Nebr., Kan., Okla., & Ark.	567	179	251	83	476	563	789	645	698	634	546	220	5,651	9,182
Texas	338	280	304	397	208	335	278	325	427	218	351	289	3,750	6,189
Colo., Mont., Utah, Wyo., & Ida.	39	7	39	93	105	157	111	206	222	185	107	0	1,271	2,216
California	336	316	521	535	538	464	584	513	514	443	424	320	5,508	7,740
Oregon & Wash.	47	63	46	269	224	168	164	156	111	166	73	81	1,568	3,007
	5,026	3,971	4,847	5,478	6,913	7,921	7,659	7,835	8,210	7,939	6,462	4,248	76,509	125,429

Shipments	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	1932	1931	Plants shipping 1932	Estimated mill value of shipments, 1932
E. Pa., N. J., & Md.	1,073	851	978	1,720	1,840	1,747	1,744	2,093	1,683	1,566	1,115	759	17,169	28,853	24	$16,650,000
New York & Maine	199	166	237	522	742	917	860	932	726	668	364	189	6,522	10,741	11	6,814,000
Ohio, W. Pa., & W. Va.	260	284	269	520	642	785	790	1,062	978	829	417	308	7,144	11,549	19	6,502,000
Michigan	121	121	128	259	416	676	644	786	849	665	158	65	4,888	7,169	13	4,446,000
Wis., Ill., Ind., & Ky.	238	249	256	611	1,032	1,419	1,666	2,018	1,706	1,375	503	179	11,252	15,938	11	7,968,000
Va., Tenn., Ala., Ga., Fla., & La.	404	359	448	537	509	532	493	604	457	580	518	377	5,818	12,311	19	6,644,000
E. Mo., Ia., Minn., & S. D.	142	150	243	591	1,023	1,320	1,439	1,530	1,524	1,306	379	201	9,848	12,272	11	8,586,000
W. Mo., Neb., Kan., Okla., & Ark.	202	239	288	505	616	637	511	661	698	631	370	164	5,522	9,633	13	5,061,000
Texas	241	256	380	368	323	324	307	386	315	381	352	165	3,798	6,265	9	4,668,000
Colo., Mont., Utah, Wyo., & Idaho.	33	38	64	126	123	128	99	141	194	144	87	44	1,221	2,060	9	1,862,000
California	413	343	547	554	510	590	510	549	434	473	455	353	5,731	7,496	11	8,266,000
Oregon & Wash.	67	62	135	223	244	189	155	206	165	125	64	31	1,666	2,864	9	3,368,000
	3,393	3,118	3,973	6,536	8,020	9,264	9,218	10,968	9,729	8,743	4,782	2,835	80,579	127,151	159	80,835,000

PRODUCTION, SHIPMENTS, AND STOCKS OF FINISHED PORTLAND CEMENT, BY MONTHS, IN 1931 AND 1932 (*thousands of barrels*)

Month	Production		Shipments		Stocks at End of Month	
	1931	1932	1931	1932	1931	1932
January	6,595	5,026	4,692	3,393	27,759	25,778
February	5,920	3,971	5,074	3,118	28,612	26,657
March	8,245	4,847	7,192	3,973	29,676	27,545
April	11,245	5,478	11,184	6,536	29,715	26,496
May	14,010	6,913	14,200	8,020	29,554	25,394
June	14,118	7,921	16,077	9,264	27,602	24,043
July	13,899	7,659	15,545	9,218	25,934	22,512
August	13,549	7,835	15,172	10,968	24,313	19,398
September	12,092	8,210	13,671	9,729	22,736	17,878
October	10,762	7,939	12,360	8,743	21,218	17,084
November	8,161	6,462	7,156	4,782	22,219	18,788
December	5,974	4,248	4,142	2,835	24,177	20,200
Totals	124,570	76,509	126,465	80,579	.....	.....

PRODUCTION AND STOCKS OF CLINKER, BY DISTRICTS, in DECEMBER, 1931 and 1932 (*thousands of barrels*)

District	Production		Stocks at end of Month	
	1931	1932	1931	1932
Eastern Pa., N. J., and Md.	1,622	668	799	563
New York and Maine	585	274	406	336
Ohio, Western Pa., and W. Va.	480	552	689	386
Michigan	314	136	641	777
Wis., Ill., Ind., and Ky.	735	648	494	522
Va., Tenn., Ala., Ga., Fla., and La.	653	540	695	478
Eastern Mo., Ia., Minn., and S. Dak.	621	449	452	355
W. Mo., Neb., Kan., Okla., and Ark.	725	249	542	430
Texas	339	338	341	224
Colo., Mont., Utah, Wyo., and Idaho.	98	34	128	340
California	589	410	1,436	1,330
Oreg. and Wash.	79	37	412	255
Totals	6,840	4,335	7,035	5,996

PRODUCTION, SHIPMENTS, AND STOCKS OF FINISHED PORTLAND CEMENT, BY DISTRICTS, IN DECEMBER, 1931 AND 1932, AND STOCKS IN NOVEMBER, 1932 (*thousands of barrels*)

District	December						Stocks at End of November
	Production		Shipments		Stocks at End of Month		
	1931	1932	1931	1932	1931	1932	1932
Eastern Pa., N. J., and Md.	1,434	805	1,310	759	4,852	3,727	3,681
New York and Maine	458	335	321	189	1,343	1,424	1,278
Ohio, Western Pa., and W. Va.	422	638	282	308	3,571	3,023	2,692
Michigan	197	153	153	65	2,056	1,493	1,406
Wis., Ill., Ind., and Ky.	707	477	375	179	2,833	2,170	1,872
Va., Tenn., Ala., Ga., Fla., and La.	572	508	432	377	1,795	1,571	1,440
Eastern Mo., Ia., Minn., and S. Dak.	600	422	212	201	3,098	2,250	2,029
W. Mo., Neb., Kan., Okla., and Ark.	688	220	372	164	1,638	1,766	1,710
Texas	291	289	214	165	726	677	554
Colo., Mont., Utah, Wyo., and Idaho.	59	0	43	44	492	524	568
California	474	320	370	353	1,103	1,000	1,033
Oreg. and Wash.	72	81	58	31	670	575	525
Totals	5,974	4,248	4,142	2,835	24,177	20,200	18,788

EXPORTS AND IMPORTS OF HYDRAULIC CEMENT, BY MONTHS, IN 1931 AND 1932

Month	Exports				Imports			
	1931		1932		1931		1932	
	Barrels	Value	Barrels	Value	Barrels	Value	Barrels	Value
January	41,199	$115,678	36,704	$82,984	95,609	$120,298	14,375	$16,648
February	25,703	88,989	12,889	39,350	21,984	25,391	83,706	69,197
March	54,599	144,579	39,105	81,856	70,378	80,360	19,173	17,215
April	40,478	116,564	30,123	69,451	53,333	58,576	59,392	41,487
May	48,028	140,953	31,634	71,048	19,325	20,568	9,223	7,358
June	43,597	107,610	33,134	72,084	32,079	42,955	20,963	15,496
July	29,344	97,837	18,872	54,814	14,332	15,582	31,518	24,904
August	39,517	106,643	25,110	48,961	8,895	11,739	78,600	60,474
September	27,570	81,399	35,270	63,018	33,574	33,520	69,258	51,570
October	24,531	68,524	28,756	52,922	39,642	42,380	60,389	41,633
November	33,200	97,796	57,811	98,187	27,940	22,235	12,237	8,364
December	21,887	54,028	.....	.....	40,147	34,314	.....	.....
Totals	429,653	1,220,600	.....	.....	457,238	507,918	.....	.....

Traffic News and Comment

Recent I. C. C. Decisions

Cement and Lime.—The Commission has found the rates on cement and lime in straight or mixed carloads, from Linwood, Ia., to Red Wing and Goodhue, Minn., not unreasonable, and has dismissed the complaint in I. C. C. Docket No. 25,188. (PIT AND QUARRY, Nov., 1932.)

Ground Limestone.—Carriers have been given authority, in response to fourth section application No. 14,449, to establish and maintain over circuitous lines or routes, for the transportation of ground limestone, c. l. min. wt. 60,000 lb., from Falling Springs, Va., to destinations in Virginia on interstate traffic, also to certain points in West Virginia, the District of Columbia, Maryland, Delaware, Pennsylvania, New Jersey and New York, the lowest rate applicable over any line or route from and to the same points constructed on the basis prescribed in Falling Spring Lime Co. *v.* C. & O., 172 I. C. C. 783, which report is made a part of this fourth section order; and to maintain higher rates to intermediate points, provided that such rates to intermediate points shall not exceed the rates constructed on the basis of the distance scales prescribed, or exceed the lowest combination of rates subject to the Interstate Commerce Act, and subject to the Commission's standard 50- and 70-per cent. circuity rules. F. S. O. No. 11,102.

Sand and Gravel.—The Commission has found the rates on sand and gravel from La Grange and Reading, Mo., to destinations on the C. B. & Q., in Illinois, unreasonable. New rates for the future were prescribed and reparation awarded. Rates are prescribed to key points with the provision that the rates to intermediate points will be unreasonable to the extent they may exceed the rate prescribed to the key point next beyond. Among the rates prescribed to apply from La Grange, are, to Mendon 76 c.; to Cameron, $1.01; to Greenfield, $1.39; and to Shattuc, $1.39. From Reading, Mo., the prescribed rate is 88 c. to Mendon; $1.13 to Cameron; $1.26 to Greenfield and $1.26 to Shattuc. Reparation was awarded on the basis of the difference in the freight charges paid and the charges which would have accrued by using the prescribed rates. Emergency rates may be added to those prescribed which are to become effective not later than April 7. I. C. C. Docket No. 24,568, Missouri Gravel Company *v.* C. B. & Q. (PIT AND QUARRY, June 15, 1932.)

Sulphur.—The Commission has found the rates on crude sulphur from Byram (Palagana), Tex., to Corpus Christi, Tex., for export or coastwise movement beyond, not unreasonable and has dismissed the complaint in I. C. C. Docket No. 25,257, Duval Texas Sulphur Co. *v.* Texas Mexican. (PIT AND QUARRY, December, 1932.)

Examiners' Reports

Amiesite.—Examiner C. J. Peterson recommends that the Commission find the rates on natural asphaltic limestone from Margerum, Ala., to destinations in official territory, not unreasonable. He further proposes that they find the rates on processed asphaltic limestone, from and to the same points, not unreasonable in the past but unreasonable for the future to the extent they may exceed the rates prescribed in Interstate Amiesite Co. *v.* A. & R., 172 I. C. C. 100, the scale therein prescribed to be extended at the rate of 10 cents per ton for each additional distance of 40 miles in excess of 1,000 miles. He proposes that the addition of emergency charges be permitted in connection with the new rates. I. C. C. Docket No. 25,059, Alabama Asphaltic Limestone Co. *v.* A. & B. B. *et al.*

Crushed Stone.—Examiner Richard Yardley proposes that the Commission find certain rates on crushed stone unreasonable and prescribe new rates and reparation. He recommends that the following rates be prescribed, from Mascot, Tenn., to Mt. Airy, N. C., $1.75; to Pinnacle, N. C., $1.65; to Lincolnton, N. C., $1.40 and to Lenoir, N. C., $1.40; from Strawberry Plains, Tenn., to Olivette, N. C., $1.40; from Jefferson City, Tenn., to Lenoir, N. C., $1.40 and to Granite Falls, N. C., $1.35; from Granite Quarry, Tenn., to Leaksville, N. C., $1.20; from Hiddenite, N. C., to Filbert and Clover, S. C., $1.00; and to Patrick Springs, Va., $1.30 per ton. I. C. C. Docket No. 25,245, Hiddenite Granite Company *v.* Yadkin R. R. C. *et al.*

Lime.—Subsequent to the refusal of the Commission to grant fourth section relief in connection with the rates on lime between points in the southwest and to points in the southwest, the carriers proposed to revise these rates by applying on lime, c.l. min. wt. 30,000 lb., Class 17.5 rates prescribed in Consolidated Southwestern Cases, 123 I. C. C. 203. Fourth-section order No. 9,600 issued in connection with the Consolidated Southwestern Cases would take care of the fourth section departures. These proposes Class 17.5 rates were suspended and a hearing was had before Examiner Myron Wotters. In his proposed report he states that the present rates have been in effect for a long time and that they are all carrier made. He proposes the following findings: The Commission should find that the respondents have not justified the suspended schedules and they will be ordered cancelled without prejudice to the filing of new schedules of rates on lime which shall not exceed the following bases, which the Commission should find will be reasonable for the future: Within cement scale III territory in Oklahoma, Texas, Arkansas and Louisiana west of the Mississippi River and from producing points in Missouri, Tennessee and Alabama, to said scale III territory, apply the scale of rates shown in appendix F, not herein reproduced, designated western Lime scale III, which is 2 c. higher than western cement scale III. Within cement scale IV territory in Oklahoma and Texas apply the scale designated in appendix F as western lime scale IV, which is 2 c. higher than western cement scale IV. The basic scale, shown in appendix F should be used in computing rates from the northwestern Ohio group, using the western trunk line formula. If the destination is in scale III territory the entire distance should be applied to the basic scale and the distance west of the Mississippi River should be applied to the scale II differentials and the results added. If the destination is in scale IV territory the entire distance should be applied to the basic scale, then the distance west of the Mississippi River, in scale III and scale IV territories should be applied to the scale III differentials, then the distance in scale IV territory should be applied to scale IV differentials, and the results added. From scale III to scale IV territory apply the entire distance to scale III plus the scale IV differentials for the distance in scale IV. The foregoing rates should be applied on all kinds of lime with a minimum weight of 30,000 lb. On all kinds of lime, with a minimum carload weight of 50,000 lb., rates should be made 80 per cent of those applicable on lime, minimum 30,000 lb. In general the present grouping of origin points should be maintained. The St. Louis group, however, should be broken up, and points north thereof, beginning with Hannibal, put in a separate group. Quincy and Marblehead, Ill., should be included in the Hannibal group, and the distance from said group should be the average distance from Hannibal and Quincy. The St. Louis group should include East St. Louis, Glencoe, Mincke, Byers, Brickleys, Glen Park, Ste. Genevieve and Mosher, and the distance should be the average distance from East St. Louis and Ste. Genevieve. The Springfield group should include Sequiota, Ash Grove and Pierce City, and the distance from said group computed from Spring-

field. The Birmingham group should include Graystone as at present, and the distance from said group should be the average distance from Graystone and Newala. The northwestern Ohio group should be preserved and the distance from Gibsonburg used. In Texas the present grouping of New Braunfels, Dittlinger, Round Rock and McNiel should be preserved, and the distance from said group should be the average distance from New Braunfels and Round Rock. In Arkansas, Limedale and Ruddels should retain their present grouping. In computing distances and checking rates the same formula used in computing western cement rates should be used. This formula is contained in appendix B to the report in Missouri Portland Cement Co. *v.* Abilene & Southern, 167 I. C. C. 650. The reference to the short line distance from Kansas City and Chanute is inapplicable. I. C. C. I. & S. Dockets No. 3,742 and No. 3,776, Lime, from, to and between the southwest.

Sand and Gravel.—Examiner E. L. Glenn recommends that the Commission find the rate on sand and gravel from Carpenterville, N. J., to Sandt's Eddy, Pa., unreasonable to the extent it exceeded 80c. and award reparation on that basis. I. C. C. Docket No. 24,850, B. G. Coon Construction Co. *v.* Pennsylvania *et al.*

While Examiner C. J. Peterson proposes the denial of an award of reparation he recommends that the Commission find the rates on sand and gravel from Elizabethtown, Tenn., for the past and from Elizabethtown and Siam, Tenn., for the future, unreasonable to the extent they exceeded or may exceed the joint lime basis prescribed in Buckland V. B. & A., 139 I. C. C. 88, from Bethlehem and Hokendaqua, Pa., to points in New Jersey and New York, applied on traffic to destinations in Virginia, and recommends an award of reparation on shipments from Elizabethton. He further proposes that the Commission should find that the maintenance of relatively lower intrastate rates from Petersburg, Va., to Virginia destinations than from Elizabethton and Siam to the same destinations resulted in undue prejudice which should be removed by the establishment of intrastate rates from Petersburg not less than those which would apply under the Buckland scale. I. C. C. Docket No. 24,840, East Tennessee Sand and Gravel Co. *v.* Sou. *et al* and No. 24,840, Sub. 1, American Limestone Co. *v.* Same.

New Complaints Filed

Sand.—New rates and reparation in connection with shipments of sand from Clayton, Ia., to Omaha, Neb., are sought on an allegation of violation of sections 1 and 6 in I. C. C. Docket No. 25,697, Sunderland Brothers Co., Omaha, Neb. *v.* C. M. St. P. & P. *et al.*

Rate-Committee Dockets

Eastern Commodity Rate Revision Committee

Fluorspar and Gravelspar.—It is proposed to cancel all l. c. l. commodity rates on fluorspar, classification basis to become effective, and to establish class 22.5 basis on carload shipments, on a c. l. min. wt. of 60,000 lb. Docket No. 90.

Pumice Stone.—It is proposed to cancel all l. c. l. commodity rates on pumice stone, classification basis to become effective, and to establish class 25 basis on carload shipments on a c. l. min. wt. as shown in the official classification. Docket No. 68.

New England Freight Assn.

Lime.—To place shippers on the Maine Central on a comparable basis with those in other lime shipping territories, shippers propose a reduction in the rate on common, hydrated, quick or slacked lime, c. l. min. wt. 40,000 lb., from Brunswick, Me., to Washington, D. C., from 35 c. to 24 c. per 100 lb. Docket No. 27,900.

Trunk Line Assn.

Crushed Stone.—Carriers propose to establish a rate on crushed stone[1] from York, Pa., to Baltimore, Md., of 90 c. per net ton. Docket No. 30,143, Sup. 1.

Lime.—Carriers propose to revise the c. l. min. wt. on all carload rates on lime from all points in Trunk Line territory to all points in New England territory to 40,000 lb., where they are less. Docket No. M-3, 158.

Plaster and Plasterboard.—Carriers propose the establishment of rates on (A) plaster and related articles, and (B) plasterboard, from Garbutt and Wheatland, N. Y., to Paper Mill and Light Street, N. Y., of (A) 16 c. and (B) 17½ c. per 100 lb. Docket No. 30,147, Sup. 1.

Shippers propose establishment of rates on (A) plaster and related articles and (B) plasterboard, from Akron, Clarence Center, Oakfield, Transit and Wheatville, N. Y., to Constable, N. Y., of (A) 17½ c. and (B) 19½ c. per 100 lb. Docket No. 30,214.

To remove fourth-section departures, carriers propose to revise the rates from Akron, Oakfield, Garbutt, Wheatville, Transit, Clarence Center and Wheatland, N. Y., to B. & O., Erie, J. W. & N. W., N. Y. C., N. Y. C. & St. L., and P. R. R. points, Kellogg, Salamanca, Carrollton, Dunkirk, Jamestown, N. Y., Oil City, Pa., Ashtabula, O., Lake View, Fredonia, N. Y., Titusville, Warren and Erie, Pa., Machias and Ebenezer, N. Y., Tryonville, Pa., Lackawanna, N. Y., and others on plaster and related articles and on plasterboard. A complete statement of proposed rates will be furnished on request. Docket No. 30,245.

Sand.—Carriers propose to establish a rate on sand[1] from Philadelphia, Pa., to Conshohocken, Pa., of 70 c. per net ton. Docket No. 30,185, Sup 1.

Sand, Gravel, Crushed Stone and Slag.—Carriers propose to publish rates on common sand and gravel, crushed stone and slag[1] from actual shipping points in Eastern Trunk Line territory to local destinations on the L. V., within a radius of 200 miles from the shipping point, except where rates were issued to meet motor-truck competition, on basis of the following scale: 15 miles or less, 60 c.; 25 miles, 70 c.; 40 miles, 80 c.; 60 miles, 90 c.; 80 miles, $1.00; 100 miles, $1.10; 125 miles, $1.20; 150 miles, $1.30; 175 miles, $1.40; 200 miles, $1.50. Docket No. 30,156, Sup. 1.

Central Freight Assn.

Dolomite.—Shippers propose the establishment of rates on raw or crude dolomite and fluxing stone from Genoa, Martin, Marblehead and Luckey, O., to Columbus, O., of $1.13 per gross ton. Docket No. 34,095.

Shippers at Genoa, Martin, Marblehead and Luckey, O., propose establishment of a rate of $1.80 per net ton on raw or crude dolomite and fluxing stone to Powhatan, O. Docket No. 34,169.

Shippers at Durbin and Cold Springs, O., propose the following rates on raw dolomite and fluxing stone: To Jackson, O., 90 c.; to Ironton and Middletown, O., $1.01; to Cincinnati, O., $1.13; to Cleveland, O., $1.02 and to Youngstown, O., $1.15 per gross ton. Docket No. 34,280.

Carriers propose to establish on raw or crude dolomite in box-cars, from all northern Ohio group 1 points viz., Bettsville, Carey, Genoa, Gibsonburg, McVitty's, Maple Grove, Marblehead, Martin, Narlo and Woodville, O., to Fairmount, W. Va., a rate of $2.10 per net ton. Docket No. 34,318.

Carriers propose to establish on raw or crude dolomite in box cars, from all northern Ohio group 1 points shown in the preceding docket, to Clarksburg and Grafton, W. Va., a rate of $2.10 per net ton. Docket No. 34,319.

Sand.—Carriers propose to publish a rate on common sand from Ft. Wayne, Ind., to Cincinnati, O., of $1.35 per net ton. Docket No. 34,243.

Sand and Gravel.—Shippers are asking that a rate be published to apply on common sand and gravel from Newtown, O., to Cincinnati, O., via the N. & W. for connecting line delivery. Docket No. 34,242.

Shippers propose a rate on sand and gravel from Cleveland, O., to Ashland, O., via P. R. R., Akron, Erie, of 90 c. per net ton. Docket No. 34,241.

Shippers propose the following rates to apply on sand and gravel from Martins Ferry, O., via W. & L. E., Dillonvale, N. Y. C.: to Amsterdam, 80 c.; to Augusta, 85 c.; to Apex, 75 c.; to Bergholz, 80 c.; to Hopedale, 70 c.; to Mechanicstown, 85 c.; to Piney Fork, O., 70 c. per net ton. Docket No. 34,149.

Carriers propose to establish rates on sand and gravel in closed equipment other than box cars, carload, from and to points in Ohio in intrastate movement, 115 per cent of the open top car rates. Docket No. 34,294.

Western Trunk Line Committee

Crushed Stone.—It is proposed to revise the distance scale used in making rates on crushed stone from Winona, Minn., to Wisconsin points, and to revise the rates to conform to the new scale shown below. Docket No. 8,229.

Miles	Present	Proposed
5	$0.75	$0.46
10	.75	.50
15	.75	.52
20	.75	.56
25	.75	.58
30	.80	.62
35	.85	.64
40	.85	.68
45	.90	.70
50	.90	.74

Ground Limestone.—Shippers propose establishment of the following rates on crushed or ground limestone [1] from Valmyer, Ill., to Winona, Minn., $2.85; to Appleton, Wis., $2.75; to Chippewa Falls, Wis., $2.86; to Eau Claire, Wis., $2.86; to Fond du Lac, Wis., $2.65; to Wausau, Wis., $2.85; to Wisconsin Rapids, Wis., $2.85 per ton. Docket No. 6,025-I.

At present there is no provision for mixed car shipments of ground limestone with lime from Hannibal, Mo., to points in Western Trunk Line territory. Shippers propose the publication of a provision for the application of the rates and c. l. min. wt. on lime to also apply on ground limestone when shipped in mixed cars with lime. Docket No. 8,227.

Lime.—Shippers propose the publication of rates on lime, c. l. min. wt., 30,000 lb., to destinations in St. L. S. F. Tariff 69-L, and similar issues of other lines, on the same basis as applicable from Springfield, Mo., and points grouped therewith. Class rates now apply. Docket No. 1,390-C.

Mica.—A commodity rate of $8.00 per net ton to apply on crude mica, c. l. min. wt. 60,000 lb., from Fox Park, Wyo., to Chicago, Ill., and points shown as taking group 3 rates in Column 10 of W. T. L. Territorial Directory 1-B, is proposed by shippers. Docket No. 8,239.

Southern Freight Assn.

Soapstone or Talc.—At the request of shippers for a commodity rate, carriers suggest a rate of 19 c. per 100 lb., to apply on imported soapstone or talc, crude or ground, straight or mixed carloads, c. l. min. wt. 50,000 lb., from Charleston, S. C., and Savannah, Ga., to Asheville, Concord, Kanapolis and Yadkin, N. C., such rate not to apply from shipside. Docket No. 60,183.

Southwestern Freight Bureau

Lime.—Shippers at Ft. Scott, Kans., propose the establishment of rates on lime, c. l. min. wt. 30,000 lb., to interstate destinations in S. W. L. territory on the same basis as those applicable from Springfield, Mo. Several years ago this basis was in effect. Then production was discontinued and the rates cancelled. Now the plant at Ft. Scott has resumed operations.

Shippers propose the establishment of rates on lime from Austin, Dittlinger, Greens Bayou, Houston, Lime City, McNeil, New Braunfels, Oglesby and Round Rock, Tex., to Cheyenne, Wyo., and other points in Wyoming, Colorado and Nebraska as named in Item 12 of S. W. L. Tariff 6-J, of 35 c. per 100 lb., c. l. min. wt. 40,000 lb.; and to Denver and south as named in Item 2,150, a rate of 25½ c. per 100 lb., c. l. min. wt. 60,000 lb. Docket No. 26,134.

A commodity rate on lime, c. l. min. wt. 30,000 lb., from Mosher and Ste. Genevieve, Mo., to Mitchell, S. D., is proposed by shippers. Docket No. 26,194.

Sand and Gravel.—Shipper at Pacific, Mo., requests that rates on sand and gravel from that point to intrastate destinations on connecting lines to which the short distance from Jedburg makes via St. Louis, be made on the basis of the Jedburg mileage. Docket No. 26,157.

Silica Sand.—Shippers at Guion, Ark., have asked for the establishment of rates on refuse silica sand to stations in Arkansas, Louisiana and Tennessee,[1] the same as apply on agricultural limestone, based on the scale applicable in connection with Item 10 of S. W. L. Tariff 162-E.

Guion and Everton, Ark., are about 10 miles apart across country, but owing to rail facilities, the rate making distances from Guion are about 100 mi. greater than those from Everton. Shippers at Guion propose that they be placed on the same basis as Everton on shipments of silica sand to stations in Arkansas, Kansas, Missouri and Oklahoma. Docket No. 26,-248.

Soapstone or Talc.—Carriers propose to establish a class 22.5 rating on crude, ground or dust, soapstone or talc, between points in the southwest and Kansas-Missouri territory. Docket No. A-927.

[1] The car lot minimum weight will be 90 per cent. of the marked capacity of the car, except, when car is loaded to full cubical or visible capacity, actual weight will apply.

British Cement Firm to Double Output of Mills

When the Ketton Portland Cement Co., Ltd., of London, England, finishes its plans for expansion and improvement of the Ketton cement plants, it will have doubled the present capacity of the mills, it is reported. Announcement of the intention to embark on the improvement program was made recently by the English concern, even now the largest producer in that country.

New buildings and additional equipment will entail the expenditure of $350,000.

Joins Cement Products Bureau of Association

E. W. Dienhart, who is well known to the concrete products industry, is now a member of the cement-products bureau staff, Portland Cement Assn., Chicago, Ill.

At present he is engaged in research and promotion work in connection with development of precast concrete joists, reinforced, for use in building floors for residences, store buildings, factories for light manufacturing occupancy, and similar structures.

The field for manufacture of precast concrete joists offers the products industry an excellent opportunity to develop a substantial new market, according to Mr. Dienhart.

Iowa Lists Paved Road First Among Its Assets

Iowa's system of modern pavement is given first place among the state assets listed in the consolidated report of the state budget director. Buildings, of various sorts and under the jurisdiction of the several state departments, rate second place.

In commenting on the foregoing, E. E. Duffy of the Portland Cement Assn., Chicago, reports that the Iowa state highway program, in which counties and the state began their cooperation about five years ago, has resulted in the concreting of more than 4,000 miles of highway, every mile of which is paying its way in economies and permanent utility.

McLanahan & Stone Buy Ocala Iron Co. Assets

McLanahan & Stone Corp., Hollidaysburg, Pa., has acquired the patents and other assets of Ocala Iron Works, Ocala, Fla., and will continue to manufacture Ocala crushers and other machinery as well as repair parts for existing Ocala equipment. The Florida plant has been closed and dismantled, according to Ward McLanahan, director of sales of McLanahan & Stone Corp.

Williamsport Licensed to Make Preformed Rope

Williamsport Wire Rope Co. recently has been added to the long list of wire rope manufacturers licensed to manufacture preformed wire rope under American Cable Co. patents. Other American concerns licensed to make preformed wire rope are: American Steel & Wire Co., Broderick & Bascomb Rope Co., E. H. Edwards Co., General Cable Corp., Hazard Wire Rope Co., MacWhyte Co., Pacific Wire Rope Co., Wickwire Spencer Steel Co., Wire Rope Mfg. & Equipment Co.

Foreign Developments

The Function of Cement in Prevention of Rust

Prof. Richard Grün of Düsseldorf contributed to a "Conference on Corrosion" held at Berlin on Oct. 17 under the auspices of German engineering, metallurgical and chemical associations, a comprehensive discussion of the function of cement and concrete in the prevention of rust. Dr. Grün pointed out that there is always a small amount of calcium hydroxide present in cement after setting, so that iron or steel embedded in cement does not rust, whether in neat cement or in mortar or concrete.

Neat cement has up to the present found but little use; one instance is in the wrapping of iron or steel pieces before shipment. Such pieces have been coated first with materials of red-lead or rubber base and then wound with jute bands saturated in neat cement. Neat cement has also been used occasionally as a pigment in bituminous coatings.

Mortar, however, is a particularly important material for rust-proofing iron and steel structures of all sorts. The mortar can be applied to the structures with the aid of wire reinforcing, or sprayed directly on to the metal with some special process. Outside of Germany mortar has also been employed for rust-proofing the interior of cast-iron pipe. Structures of reinforced concrete, Dr. Grün noted, are remarkable for their resistance to external conditions, such as rusting, as well as for their strength and fire resistance. Under the new Mellon process, completed steel structures also can be thoroughly coated with concrete.

Free Lime Liberated At High Temperature

Ashkenasi reported in *Cement and Cement Manufacture*, Dec., 1931, on the formation of free lime in cement clinker at around 1,050 deg. C., and asserts expressly that the dissociation takes place only in the presence of gypsum. Yet Carlsen, in the Bureau of Standards *Journal of Research*, Nov., 1931, found that every clinker between 1,000 and 1,300 deg. C. yields free lime. The authors consequently ran tests which at once showed that lime is liberated even without the presence of gypsum, but that gypsum accelerates the action (see the table).

To see whether gypsum was decomposed. 1 part of pure CaO and 9 parts of gypsum were mixed and ignited. As the mix after ignition still showed 10 per cent. of CaO, no dissociation of gypsum could have taken place.

The *rôle* of the gypsum was even more evident on further heating. With the cement used, around 11 per cent. seems to be the upper limit for the liberation of free lime.

The explanation made by assuming that the water of hydration was responsible is incorrect, since the quantity is not sufficient, and because the water is completely dissociated well below the temperature at which free lime appears. The lime formation is influenced by the temperature and length of heating, by the material of the crucible, the quantity of the sample and the furnace conditions. Undoubtedly only the high-lime silicates and aluminates yield free lime, while the low-lime components are not decomposed after repeated ignition. No clear relation to the original lime content could be shown. High SiO_2 seems to retard the decomposition, Fe_2O_3 to facilitate it. By means of solution tests before and after ignition it was found that the gypsum goes through the reaction without alteration and consequently acts merely as a catalyst.

Tests made on other sulphates and other calcium salts under conditions as nearly identical as possible, 10 per cent. of salt being mixed and ground with 90 per cent. clinker and ignited at 1,050 deg. C., gave free-lime percentages as follows: $BaSO_4$ 1.4; $CaSO_4$ 12.9; $PbSO_4$ 9.1; $MnSO_4$ 0.0; $NaSO_4$ 8.5; $CuSO_4$ 8.1; $Ca_3(PO_4)_2$ 0.0; $Ca.Cl_2$ 9.7; $CaNO_3$ 4.4.—Dr.-Ing. D. Steiner and B. Bartos in *Tonindustrie-Zeitung* 56:944-945, Sept. 19, 1932.

	Loss on Ignition 2 h. at 1050°	Free Lime Not Ignited	Ignited Emley Proc.
Good clinker, 0% on 4,900-mesh/sq.cm. sieve.....	0.28	0.44	1.77
Same, mixed with 10% of gypsum.....	2.32	0.44	2.66
Same, ground with 10% of gypsum.....	2.41	0.33	8.88

Analysis of the gypsum: Insoluble 2.82%, water of hydration 19.0%, SO_3 42.63%, corresponding to 91.6% $CaSO_4..2H_2O$.

Conclusions Drawn from French Concrete Tests

From crushing tests on concrete cubes at the French Ecolé Nationale des Ponts et Chaussees during the five years 1927-1932 Edmond Marcotte, director of the mechanical and physical testing laboratory of the school, has made a study of the strength of concrete as a function of time, cement content and water-cement ratio, respectively. This study is reported in *Annales des Ponts et Chaussees* (102: 230-249, Sept.-Oct., 1932) and in a modified form in *Revue des Materiaux de Construction* (No. 277:411-417 and 278:460-461, Oct. and Nov., 1932).

The only tests included were on specimens which had been prepared by hand at the laboratory. Every concrete was made up from 400 liters of Seine sand and 800 liters of Seine gravel, plus amounts of cement and water which varied from test to test. The tests represent 83 Portland-cement concretes, 46 high-early-strength Portland-cement concretes and 30 fused-alumina-cement concretes.

After plotting the maximum and minimum curves for the strengths of the standard Portland concretes in relation to the time of hardening (the time being plotted by logarithms), M. Marcotte plots the curve of the probable averages according to the laws of probability, especially Gauss' laws. From 7 days to a year this average is practically a straight line. At two and three years the results are not conclusive because of the small number of tests beyond the one-year period; with that reservation, it appears clear that the strength of Portland-cement concrete is a linear function of the logarithm of the time.

Similar curves are plotted for the concrete strength as a function of the cement content, the cement varying from 250 to 400 kg.; the aggregates, as throughout the whole series of tests, were 400 liters of sand and 800 liters of gravel. These curves, for standard Portland cement, are notable in that the maximum and minimum strengths are remarkably far apart; the "probable averages," particularly after reaching 90 days, are very closely a linear function of the cement content.

Still another set of curves represents the probable averages of strength at progressive ages for varying water-cement ratio, the latter varying in each case from 18 to 33 liters of water per 50-kg. sack of cement, or 36 to 66 per cent. by weight. The strengths here are rather scattered, but at 7 days the curve of probable average strengths is clearly a straight line; the same is true in general for 28-day and 90-day strengths, although at 28 days the strength is practically constant between 25 and 30 liters of water, and at 90 days the strength remains about the same between 25 and 28 liters. An interesting observation on comparing the curves for the progressive ages is that the "angular coefficient" increases with age: a way of saying that the effect of the gaging water is more apparent at 90 days than at 28 or 7 days.

The tests on specimens of concrete from high-early-strength Portland cements did not yield quite such clear results, partly because of the smaller number of specimens involved. Nevertheless, the curve of the probable average strengths in relation to the logarithm of age shows a series of seg-

ments of which the angular coefficient tends to diminish with time; one can say, then, that the strength of concretes from high-early-strength Portlands increases less rapidly with age than does the strength of ordinary Portland concretes. As for the effect of varying cement content, it can only be said on the basis of these tests that contents of 250 to 300 kg. of cement seem to give more marked effects at the early ages than at 90 days, and that on the contrary the effect of contents of 350 to 400 kg. is not marked until after 7 days. Conclusions from a study of strength in relation to water-cement ratio were difficult for the early ages; at 2 and 3 days and up to 27 liters of water per 50-kg. sack of cement (54 per cent.) increased water content seems to add to strength. At 7 days the relation is almost linear as in the case of the standard Portlands, but with a smaller angular coefficient. At 28 and 90 days the linear relation is clearer, but the effect is not very considerable between 22 and 31 liters (44 to 62 per cent.) of water. It seems that the effect of the water-cement ratio on the strength of high-early-strength-Portland concretes is less marked than with the standard Portlands, the latter in general requiring less gaging water for hardening.

Studies of the concretes from fused-alumina cements gave no conclusions for the effect of increasing cement content. The relation of strength and logarithm of age lies in the form of a straight line at periods from 2 days to a year, but between one and two years there is no considerable increase in the "probable average." There seems to be a relation in these cements also between strength and water-cement ratio, but with a zone of indecision between 50 and 56 per cent. water content.

New Plant Installed at French Porphyry Quarry

One of the largest crushed-stone operations in the central region of France is that of the Societe Dupre Pere et Fils, which has recently been enlarged to a capacity of 100 metric tons an hour. The quarry, located three kilometers from the town of Vichy, was opened in 1915 by a company employing German prisoners of war for labor and providing crushed stone for military uses. The stone is a dioritic porphyry with good mechanical properties both for the customary uses of crushed stone and for dimension stone.

The war-time operation of the quarry was abandoned in 1918, and the present owners acquired it the next year. The crushing-and-screening plant was practically rebuilt, being equipped with crushing rolls and rotary screens. This plant was sufficient until increased demands a few years ago made the construction of a new unit imperative. The original hand loading in the quarry had in the meantime, in 1928, been replaced by a steam shovel with a capacity of 450 to 500 cu. m. per day. Steam locomotives and quarry cars carry the stone to the new plant, where the rock is discharged directly to a large jaw crusher.

The new plant unit, as described in *Revue des Materiaux de Construction* (No. 278, pp. 463-468, Nov., 1932), is built in close connection with the old, so that a part of the old equipment remains in service for secondary crushing and screening, and the remainder can be used at any time in case of shut-down of the new plant. The principal equipment in the new unit is a 48-in. by 36-in. primary jaw crusher, a belt-bucket elevator, a double-jacketed rotary screen 27 ft. long and 88 in. in diameter, and a secondary gyratory crusher that reduces oversize. Three products of the main screen are dropped to reinforced-concrete bins in the new plant. The 18- to 40-mm. (¾- to 1½-in.) stone can either be dropped to a bin or conveyed to crushing rolls in the old plant and there re-screened. Products of the secondary gyratory crusher are re-screened in a second rotary screen.

Water Vapor and Alkali Change Set of Cements

From a long series of experiments to determine the causes which change a normally slow-setting to a rapid-setting cement and *vice versa*, Dr. Paul Schachtschabel has concluded that the determining factors are the water vapor of the atmosphere and the alkali content of the cement, confirming and adding to earlier investigations on the same subject.

These experiments and the conclusions drawn from them are reported in *Zement* for Nov. 17 and 24 (21:643-647 and 658-661). It was found that in general a low water-vapor content in the air tends to make the cement rapid-setting and higher vapor contents make it slow-setting. The acceleration of the setting time depends on the formation of alkali carbonates and the consequent decomposition of the admixed gypsum, rather than in changes in the clinker meal itself. Retardation of the set, on the other hand, is caused by the action of the moisture of the air on the cement itself; in such a case less gypsum admixture is required for retarding the set of the cement, and beyond that the alkali carbonate is decomposed by the gypsum before the clinker meal begins to set. Tricalcium aluminate and alkali aluminate are converted into hydrates by the action of water vapor; besides its physical effect this reaction is the essential one in the retarding of the setting time.

Because of the accelerating action of the alkalies, the investigator suggests that the alkali content of a cement be reduced when practical through the use of a clay low in alkali or by admixture of sand; otherwise by care in the mixing and burning of the raw material. Part of the alkali is of course volatilized in burning. Investigations have shown that from a raw meal with 1.1 per cent. alkali 40 to 50 per cent. of the latter is driven off in modern shaft kilns and 30 to 35 per cent. in the rotary kiln (dry-process, exhaust-gas temp., 750 deg.). However, rapid-setting cements are comparatively rare in rotary-kiln operation as compared with shaft-kiln cements because of the more uniform burning in the rotary kiln.

The amount of gypsum admixture should be calculated in consideration of the alteration of the gypsum that takes place in grinding. If the gypsum is not more than 50 per cent. dehydrated, the admixture should be greater than if the gypsum is largely converted into hemihydrate or soluble anhydride. Cements should preferably be ground in a screened mill if the temperature of the cement at the discharge of the mill is higher than about 110 deg. C., to decrease the amount of dehydration. If the temperature is less than 90-100 deg. the admixture of 0.5-1.0 per cent. of calcium or magnesium chloride is suggested.

Disturbance of the setting time is not to be feared during silo storage, but cements sometimes become rapid-setting after handling in paper sacks if the gypsum admixture is too low.

Slag from Chrome Steel Makes Good Refractory

A new refractory with remarkable heat-resistant properties, recently put on the market in Germany under the name Siemensit, is produced from the slag resulting in the manufacture of chrome steel. Its development, in fact, was occasioned by experiments made to turn this otherwise waste material to some use. It consists principally of the oxides of chromium, magnesium and aluminum, and is poured into blocks directly from the molten state.

Tests on this material made at the Chemical Laboratory for Clay Industry (Chemisches Laboratorium für Tonindustrie) at Berlin show an exceedingly dense structure; very high modulus of elasticity, and good heat conductivity. The blocks remained unaltered in the fire-resistance tests at Seger cone 42, the highest in the Seger scale. Tested at 2-kg. per sq.cm. loading they resisted temperatures up to 1,810 deg. C., the maximum of the furnace available for the test. In expansion tests, without loading, the expansion is almost rectilinear to 900 deg.; the maximum was 1.2 per cent. Test specimens withstood without alteration tests for attack by various slags and molten sodium sulphate, showing excellent adaptability for kilns and furnaces where attack by such materials is one of the most serious problems.—Dr.-Ing. Justus Schmauser in *Tonindustrie-Zeitung* 56:1123-1124, Nov. 10, 1932; Dr. Hans Hirsch in *Tonindustrie-Zeitung* 56: 1147-1149, Nov. 17, 1932.

Recent Patents

AMERICAN

Cement and Concrete

Water-tank for concrete mixers. Joseph Eggert, Columbus, O., assignor to Jaeger Machine Co., same place. No. 1,888,551.

Process for manufacture of bituminous cement mortar, cement concrete, and the like. Albert J. de Lange, Amsterdam, Netherlands, assignor to Flintkote Corp., Boston, Mass. No. 1,889,437.

Means for heat-treating material (cement kiln). Frank C. Greene, Oconomowoc, Wis. No. 1,890,662.

Discharge and distributing mechanism for concrete mixers. Alexander Foster, Jr., Philadelphia, Pa., and Charles F. Ball, Milwaukee, Wis., assignors to Chain Belt Co. No. 1,890,-982.

Crushing and Grinding

Hammermill. Christian Nielsen, Copenhagen, Denmark, assignor to F. L. Smidth & Co., New York, N. Y. No. 1,889,129.

Method and apparatus for pulverizing materials. William DeCoursey, St. Louis, Mo. No. 1,889,436.

Drilling

Safety device for rock drills. Earl B. Lear, Phillipsburg, N. J., assignor to Ingersoll-Rand Co. No. 1,889,409.

Dustless rock drill. James F. Shook, Phillipsburg, N. J., assignor to Ingersoll-Rand Co. No. 1,889,422.

Valve for rock drills. William A. Smith, Sr., Easton, Pa., assignor to Ingersoll-Rand Co. No. 1,889,423.

Excavating

Excavating machine. Henry C. Beckwith, Ravenna, O., assignor to Byers Machine Co., same place. No. 1,889,590.

Excavator construction. Earl H. Fundom, Kenton, O., assignor to Marion Steam Shovel Co. No. 1,890,-727.

Power excavator. Earl H. Fundom, assignor to Marion Steam Shovel Co.

Forged dipper tooth. Fred Finkl, Chicago, Ill., assignor to A. Finkl & Sons Co., same place. No. 1,890,981.

Forged dipper tooth. Aubrey R. Lane, Chicago, Ill., assignor to A. Finkl & Sons Co. No. 1,890,997.

Excavating mechanism. Le Roy L. Dean, Longview, Tex. No. 1,891,142.

Screening and Separating

Screening and concentrating apparatus. Edward O'Toole, Gary, W. Va. No. 1,888,636.

Apparatus for magnetic separation of materials. Georg Ulrich, Magdeburg, Germany. No. 1,890,551.

FOREIGN

Cement

Improvement of slag cements. P. Ducret, Paris, France. German 561,-037.

Production of cements. I. G. Farbenindustrie Akt.-Ges., Leverkusen, Germany. German 560,887, addition to 555,893.

Production of white, yellow or reddish cements. Arno Andreas, Münster, Westphalia. German 561,412.

Treatment of cement plaster. Scottish Dyes, Ltd., Grangemouth, Scotland. German 562,291.

Production of cement. Wilh. Schulze, jun., Magdeburg-Cracau, Germany. German 563,604.

Portland cement. W. I. Jung. Russian 24,770.

Concrete and Concrete Products

Process and apparatus for manufacture of concrete units. M. Stühler, Cologne, Germany. German 560,885.

Production of cement slabs that can be ground or polished. C. Degen, Munich-Gladbach, Germany. German 561,267.

Production of cast articles from hydraulic binders. H. Herzbruch, Essen, Germany. German 561,615.

Rapid-setting and hardening mortar or concrete resistant to corrosive waters. K. Winkler, Altstetten. Swiss 152,544.

Apparatus for producing air-free concrete, mortar or other hydraulic mixture. E. Freyssinet, Neuilly-sur-Seine, France. German 562,481.

Device for testing the plasticity of concrete. I. R. Boguzki. Russian 24,674.

Process for manufacturing hollow elements for constructions in cement, concrete and the like. J. M. D'Artois, British 381,721.

Centrifugal machines for making conical hollow bodies, particularly reinforced-concrete masts or the like. M. Stühler and P. Luhdorff. British 382,024.

Crushing and Grinding

Pulverizing of materials by jet impact. P. Anger. British 381,591.

Jet impact pulverizer. P. Anger, British 381,605.

Hammer pulverizer. Compagnie Francaise Howden Buell Combustion. British 382,211.

Roller grinding mills. Miag Mühlenbau und Industrie Akt.-Ges. British 382,218.

Drilling

Distributing valve for rock drills. W. W. Triggs (Ingersoll-Rand Co.). British 380,523.

Drill-sharpening machines. J. Rule and Holman Bros., Ltd. British 381,-603.

Hammer rock-drill. Rock Drill Inventions (Pty.) Ltd., assignee of Gunnar Bergstrom, Johannesburg, South Africa. Canadian 327,313.

Kilns

Heating of rotary kilns. O. Lellep, Dessau, Germany. German 561,510.

Process of operation tunnel kilns and tunnel kiln applicable to the process. H. Koppers Akt.-Ges., Essen, Germany. German 562,809.

Rotary kiln. Kohlenveredelung und Schwelwerke Akt.-Ges., Berlin. German 562,922, addition to 508,952.

Charging device for fusing kiln. Siemens & Halske Akt.-Ges., Berlin-Siemensstadt, Germany. German 562,742.

Apparatus for utilizing waste heat in rotary kilns. Arno Andreas, Münster, Westphalia. German 563,884.

Process and device for removing deposits from rotary kilns. Arno Andreas, Münster, Westphalia. German 563,750, addition to 552,237.

Materials Handling

Conveyor systems. J. E. Pollack (Ges. Zwietusch & Co.). British 381,642.

Dumping device for cars and the like. H. Lees & Co., Ltd., and A. W. Biles. British 382,033.

Automatic tipping skip. A Faure and A. Faure. British 382,192.

Cement-handling apparatus. Hercules Cement Corp., Philadelphia, assignee of Morris Kind, Bryn Mawr, Pa. Canadian 327,282.

Mining and Quarrying

Pit props, arches and the like. E. W. Davies. British 381,789.

Steel caps for pit props. F. Richards. British 381,808.

Tubular-steel pit prop. R. E. Barker. British 381,795.

Mixing

Means for mixing granular, powdered or like substances. Murex, Ltd., A. B. Smith and H. A. Skelley. British 382,087.

Process for mixing non-homogeneous finely-divided solid materials. W. W. Triggs (International Precipitation Co.). British 382,113.

Unclassified

Refractory mortar. Dr. C. Otto & Co., G.m.b.H., Bochum, Germany. German 561,793.

Production of practically iron-free alumina from clay. I. G. Farbenindustrie Akt.-Ges., Leverkusen, Germany. German 562,498.

Production of aggregate for mortar or concrete. J. E. Greenawalt, New York, N. Y. German 562,485.

PIT AND QUARRY *will furnish, at its actual cost, a copy of any patent cited here. A charge of ten cents per copy is made by the U. S. Patent Office, Washington, D. C., and readers may procure a copy directly by addressing the Commissioner of Patents, with payment for copies requested. Postage stamps are not accepted by the Patent Office. We will endeavor to obtain copies of foreign patents for our readers but we cannot give assurance in every case for the reason that copies of such patents are not printed for distribution as liberally as are the American copies, nor is there a fixed charge per copy.*

Manufacturers' Publications

Copies of any of these publications may be had by writing the manufacturers who publish them. Please mention PIT & QUARRY *when writing.*

Air Cleaners

Vortox Equipment. (Vortox Manufacturing Co., Claremont, Cal.) A loose leaf catalogue describing and illustrating a wide variety of air cleaners and breather caps designed to provide maximum protection against the dust hazard when properly installed on power units in tractors, motor trucks, shovels, Diesel engines, air compressors and other industrial machinery.

Concrete Mixers

More Than a Mile of Pavement a Day! (Folder. The Jaeger Machine Co., Columbus, O.) Describes and illustrates Jaeger's new method of high-speed road building without the use of pavers. The equipment consists of a concrete spreader and a "road-builder" mixer truck.

Dust Helmets

Man, What a Helmet! (6 p. Pangborn Corp., Hagerstown, Md.) Describes and illustrates a new dust helmet which was brought out in an effort to combat the hazards of silicosis among workers in non-metallic minerals.

Mixers, Portable

The Typhoon. (4 p. The Patterson Foundry & Machine Co., East Liverpool, O.) Describes and illustrates a portable mixer, supplied in either direct or geared drive, for mixing, blending and agitating fluid and semi-fluid materials.

Motors

A Built-In Capacitator Motor. (Folder. Howell Electric Motors Co., Howell, Mich.) A compact motor for light drives is described and illustrated in this new mailing piece. Supplied in horizontal or vertical models with either rubber, machined or flange mountings.

Synchronous Motors. (54 p. General Electric Co., Schenectady, N. Y.) A new and complete catalogue of synchronous motors of all types for a wide range of applications. The text matter is a condensed treatise on this phase of electrical engineering.

Nozzles

Binks Spray and Atomizing Nozzles. (4 p. Bull. 6A. Binks Manufacturing Co., Chicago, Ill.) A loose-leaf section of a complete catalogue on spraying equipment. This section is of interest to sand-and-gravel and crushed-stone producers since it describes and illustrates the use of washing nozzles for the effective washing of gravel and stones over revolving and vibrating screens.

Plant Equipment

Kennedy Products. (112 p. Bull. No. 16. Kennedy-Van Saun Manufacturing & Engineering Corp., New York, N. Y.) A complete catalogue of equipment used in mining, crushing, cement and chemical plants. Numerous drawings, sectional illustrations and phantom photographs serve to amplify the descriptive portions of the text.

Pumps

Single Stage Centrifugal Pumping Unites. (12 p. Bull. 218. Pennsylvania Pump & Compressor Co., Easton, Pa.) Describes and illustrates a line of self-contained pumping units of the single-stage, single-suction, enclosed-impeller type.

Separators, Air

Raymond Small Batch Mechanical Air Separator. (Folder. Raymond Bros. Impact Pulverizer Co., Chicago, Ill.) Describes and illustrates a mechanical air separator for laboratory and industrial use. The machine is a useful unit for small operations, classifying powdered materials up to 300-mesh fineness and in quantities up to 700 lb. per hr.

Tires

Zero-Pressure Tires. 10p. (B. F. Goodrich Rubber Co., Akron, O.) An illustrated booklet describing the new zero-pressure tire designed for tractors, graders, and similar equipment. A comparison is made between this tire and the solid and pneumatic tires now in use on this type of equipment.

Pumpings from the Old Pit

Fifteen Years Ago

F. W. Connell, secretary of the Indiana Crushed Stone Assn., was in charge of the convention and highway short course held at Purdue University January 29-31, 1918, for the county highway superintendents of the Hoosier state.

* * *

A story and illustrations appeared regarding the operations of the new river plant of the Northern Gravel Co. at Muscatine, Ia.

* * *

Ten Years Ago

The new pulverizing plant of the Waukesha Lime & Stone Co. of Waukesha, Wis., was described. The operation, complete in detail, set a record for erection, it having started operation just six weeks after construction started.

* * *

The annual convention of the National Crushed Stone Assn. took place January 15-17, 1923, at Chicago, Ill., sessions being held at the LaSalle Hotel.

* * *

Prices in the New York market were as follows: Gravel, $2.00 @ $2.75 per cu.yd.; sand, $1.00 @ $1.75 per cu.yd.; crushed stone, $1.75 @ $1.90 per cu.yd.; Portland cement, $2.60 per bbl.

* * *

Five Years Ago

Improvements totalling $750,000 were being planned for the Hagerstown, Md., plant of the North American Cement Corp.

* * *

The United Talc & Crayon Co., of Glendon, N. C., began rebuilding its plant which had been destroyed by fire.

* * *

A mill addition involving the expenditure of nearly $1,000,000 was being erected at the Limedale, Ind., plant of the Indiana Portland Cement Co., an International Cement Corp. subsidiary.

* * *

L. L. Elles, formerly with the San Joaquin Light & Power Co. was appointed general sales manager by the Yosemite Portland Cement Co. of Fresno, Cal.

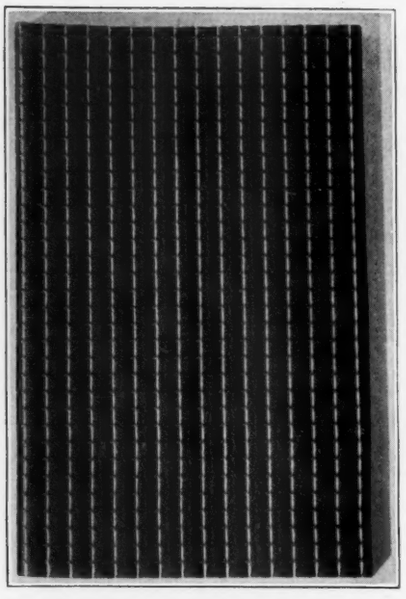
New Machinery and Supplies

Automatic Brushing for Vibrating Screen

The Productive Equipment Corp., Chicago, Ill., announces an automatic cleaning device for its Jigger vibrating screen. This consists of a brush carriage, driving belts, and a chain-case driving mechanism. The screen cloth is brushed from below in both directions. An electrical timing device allows the number of times the brush is to be operated per hour to be adjusted to operating conditions. This equipment is designed primarily for use where finely-ground limestone, fine silica sand, or other similar product is made.

Non-Skid Surface Makes Leather Belting Better

One of the biggest steps forward in the field of power transmission was made recently by E. F. Houghton & Co., Philadelphia, Pa., when it offered industry its new Vim Tred leather belting. As the illustration shows, this new belt has a non-skid surface which gives the belt greater pulling power, prevents slipping, smooths operation and has the advantage, according to the maker, of having a lower operating cost than ordinary leather belts.



A section of the new leather belting showing the tread-like surface.

The new belt was first tried out in 200 industrial plants before it was offered for general use. In these installations, it proved to be all that it was designed to accomplish.

Due to its greater gripping power, Vim Tred belting has proved ideally suited to short-center drives.

Sand, Stone Scrubbers Employ New Principle

The Niagara Roller Bearing Screen Co., 40 Pearl St., Buffalo, N. Y., has developed a new line of equipment featuring new and interesting principles. Economical production has been the aim in this development and, as the Niagara screen ushered in a new era of modernization in grading, so these new machines carry on an equally progressive development.

An accompanying illustration shows the Niagara gyratory scrubber. This trough, or tube, scrubber is radically different, embodying an entirely new principle in scrubbing. The trough is actuated by means of an eccentric shaft which gives it a circular or gyratory motion. This motion, acting in one direction, turns or whirls the material in the opposite direction causing it to surge and cascade in a spiral path. The material is alive and turning at all times allowing removal of fines and dirty water. Power consumption is remarkably low. This machine can also be made with multiple tubes—that is a machine can have any number of tubes depending on the capacity required. It features high capacity with low power consumption—a 50-ton machine requiring only 5 to 7½ hp.

The Niagara centrifugal sand scrubber and soft-stone breaker accomplishes its scrubbing by means of centrifugal force. The machine consists of a series of horizontal revolving disks provided with scrubbing sections and return baffles to give the material a number of similar treatments before its discharge from the machine. The number of disks required is dependent upon the amount of clay, soft stone, and foreign material to be removed. The water acts as a cushion and, by its regulation, a severe action that will break up soft stone can be obtained. The more water used the greater the cushion and the less breakage of the stone. With very little water a hard, sharp, clean, and cubical stone sand can be obtained. It is of unlimited capacity and as a sand maker, produces first-class, clean sand from waste stone.

Left—The new gyrating-tube scrubber. *Right*—The centrifugal sand washer.

The Niagara testing unit operates on a new principle and has proven very effective in screening, having successfully separated material up to 325 mesh. An ingenious rachet arrangement actuates the machine. Even the finest material will not blind with this motion. It is a combination of a vertical vibration, a variable rotating motion, and adjustable inclination. Standard round test screens, 8 in. in diameter, are furnished with the machine but other diameters or specially shaped containers can be supplied if specified. The low first cost of the machine, together with the remarkable results obtained, makes it an indispensable adjunct of stone, sand-and-gravel and industrial plants where close sizing of material and proper control of finished product is desired. The Niagara industrial unit is a compact self-contained screening unit for moderate operations. It is equipped with rectangular screen sieves and the capacity depends upon the size of wire mesh. It is the ideal equipment for small industrial work up to 325-mesh sizing. The angle of discharge is adjustable.

The combination testing unit for laboratory and general test purposes.

The 47-lb. industrial screening unit.

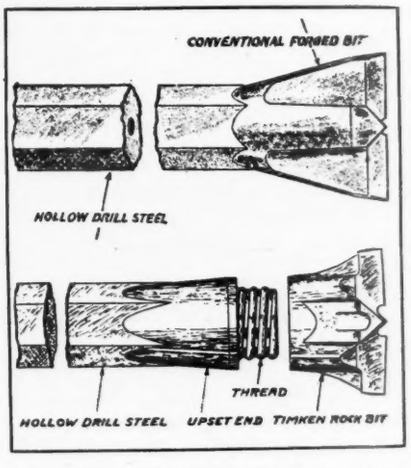
Replaceable Drill Bits Eliminate Resharpening

Three years ago, engineers of the Timken Roller Bearing Co., Canton, O., began experimenting with a new type of rock drill. Months of engineering research were spent in studying materials and designs before a bit was manufactured. Subsequent to that, hundreds of bits of different designs were made and tested in drilling service. Meanwhile, Timken metallurgists developed various alloys of special electric steel. Finally a combination of alloy steel and design was worked out and 2,000 bits were turned out and placed in test service throughout the country. Field performances proved the bit to be all that was expected for it and it is now being offered to quarry operators.

The Timken rock bit replaces the conventional bit which is forged on the end of the hollow drill steel. It is held tightly against an upset shoulder on the steel by means of a special thread designed for strength and easy detachability. This left-hand thread is opposed to the direction of rotation of the steel so that the bit is kept tightly against the shoulder while drilling. The hammer blow is transmitted from the steel through the shoulder to the body of the bit. None of its force is absorbed by the thread.

When a Timken bit becomes too dull for further service it is merely detached and replaced with a new one—a matter of seconds. Experience on many operations shows that it is much more economical to throw away a used bit than it is to resharpen the conventional type.

Equally important, the Timken bit is said to drill farther than the conventional upset bit, since it is forged from a special alloy of fine-grained, high-carbon steel made in electric furnaces and carefully heat-treated to give maximum strength, life, and wear resistance. Every Timken bit is made under close control and supervision instead of trusting to "hit-or-miss" methods of resharpening.



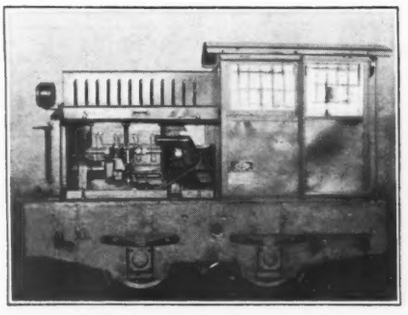
Conventional forged bit and the new detachable bit compared.

New Diesel Locomotive Defeats Foreign Rivals

The Whitcomb Locomotive Co. of Rochelle, Ill., has just shipped one of its new Diesel-powered, mechanical-transmission-drive locomotives to Porto Rico, which was sold in competition with the most prominent German and English Diesel locomotive manufacturers. Whitcomb's success clearly establishes the fact that American designed and manufactured Diesel powered equipment has assumed leadership in what has commonly been considered a European development.

The Whitcomb Diesel locomotive in question is one of a new series incorporating a solid-injection power plant having the same general performance characteristics as the gasoline engine which it replaces. It has a total weight of 16,000 lb., evenly distributed over four drivers and will handle a trailing load of 277 tons on a level track. The hourly fuel consumption is less than 2 gal. with the Diesel engine operating at a 50 per cent. load factor which is seldom exceeded in actual service. The Diesel engine is equipped with an electric starter and the control system has been simplified to eliminate any possible confusion on the part of the operator. From the viewpoint of maintenance, this Diesel locomotive will not introduce any complications and the operating expenses will be appreciably less than for a similar assembly powered with a gasoline engine.

This present Whitcomb locomotive is the result of several years experience with the Diesel power plant and represents a design that promises further economies in haulage costs. The company now offers the trade a complete line of modern Diesel powered locomotives with mechanical transmissions and electric drives.



New Diesel-powered locomotive.

Renewable Bronze Liner in New Drifting Drill

The Gardner-Denver Co., Quincy, Ill., announces a new light-weight, all-purpose drifting drill in the 2½-in. cylinder class, suitable for mines and quarries.

The separate cylinder bushing has been eliminated and a renewable bronze liner pressed into the cylinder supporting the front end of the hammer. This liner also serves as the inner wall of the integral lubricator, through which the lubricant is fed to the rear end of the chamber. The machine is also designed so that a line oiler may be used for lubrication if preferred.

The tubular-type valve, located concentrically with the hammer, is very efficient in design and operation, and is largely responsible for the high drilling-speed, low air-consumption, and lack of vibration, which are outstanding characteristics of this machine. A dual connection allows the air and water to be introduced either from the side or the back of the drill. The throttle valve handle is retained without the use of nuts or bolts, thus eliminating a frequent source of annoyance to the drill operator.

The drill rides low in the shell and the absence of protuberances permits drilling close to the wall or back, where holes at extreme angles are needed.

Light-wheel drifting drill.

It weighs only 154 lb. with the standard mounting, and can be supplied for round-lugged or straight-shank tappet steels, and for operating either wet or dry. Spring handles can be furnished for using it as a heavy-duty sinker.

New Incorporations

STANDARD LIME PRODUCTS CO., INC., Los Angeles, Cal. $1,000 shares. Karl R. Sleeper, Frank H. Berger, and David C. Levinson (415 Arcade Bldg)., all of Los Angeles, directors.

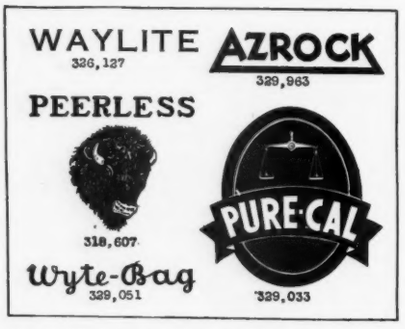
CENTRAL SILICA CORP., Collingwood, Tenn. Capital $40,000. Robert H. Carlson, Kirk Henry and F. Robert Switzer, incorporators.

FERRY VIEW SAND & GRAVEL CO., INC., Pontiac, Mich. Capital $5,000. Joseph Bauman, Rochester & Bauman Rd., Clawson, Mich.

INTERNATIONAL GYPSUM CO., LTD., St. Johns, Newfoundland. New corp. Capital $1,750,000; $1 par value. Company plans to develop deposit at Flat Bay Brook and installing crushing plant.

New Trade-Marks

TRADE-MARKS recently passed for publication by the United States Patent Office and in line for registration unless opposition is filed are described briefly and illustrated below. This feature appears occasionally in PIT & QUARRY *through arrangements with the National Trade-Mark Co., Washington Loan & Trust Bldg., Washington, D. C. This concern will make an advance search free of charge on any trade-mark which producers may contemplate registering. Send inquiries direct to the company.*



No. 318,607—*Peerless*—For wallboard, plaster-board and plaster, United States Gypsum Co., Chicago, Ill. Claims use since 1907 for plaster and since April, 1921, for wall-board and plaster-board. (The word "Peerless" is disclaimed apart from the mark as shown.)

No. 326,127—*Waylite*—For building block, brick and other unit shapes and articles manufactured in whole or part from slag, also for masonry cement and mortar and aggregates for concrete of all types when made in whole or in part from furnace slag. Danville Brick Co., Danville, Ill. Claims use since April 23, 1931.

No. 329,033—*Pure-Cal*—For lime. The word "pure" is disclaimed for registration purposes apart from the mark shown in the drawing. Western Lime & Cement Co., Milwaukee, Wis. Claims use since January 13, 1931.

No. 329,051—*Wyte-Bag*—For hydrated finishing lime. Kelley Island Lime & Transport Co., Cleveland, O. Claims use since March 1, 1932. (The exclusive use of a white bag as a container for lime is disclaimed.)

No. 329,963—*Azrock*—For asphalt plank, floor tile, industrial tile and expansion joints. Uvalde Rock Asphalt Co., San Antonio, Tex. Claims use since January 15, 1932.

Superior Stockholders Meet in Annual Session

Meeting in annual session, stockholders of Superior Portland Cement, Inc., of Seattle, Wash., gathered recently to consider company business. The year 1932 was the 24th of the company's operations and the 17th of continuous dividend payments. Considerable optimism and enthusiasm was expressed in the annual report which showed a "better than satisfactory" average for the year ended, despite current drastic curtailments in building operations.

The stockholders elected the following members of the board of trustees to serve during the ensuing year: R. V. Ankeny; M. A. Arnold; George E. Dickinson; Herman Goetz; James H. Kane; Edwin P. Lucas; John J. Murphy; Chester N. Reitze; J. A. Swalwell; Gordon Tongue; C. L. Wagner and Mrs. John Pike.

Officers elected were: E. P. Lucas, president; C. N. Reitze, vice-president, and general manager; G. E. Dickinson, vice-president and secretary; C. L. Wagner, vice-president in charge of operations; and Gordon Tongue, treasurer and sales manager.

With the Makers of Equipment

The newly-formed Stoker Division of The Patterson Foundry & Machine Co., East Liverpool, O., announces the appointment of new district representatives to handle their commercial and industrial stokers, ash conveyors, cast-iron ash-storage tanks and soot blowers. The Homer-Read Co., of 105 Vandergrift Bldg., Pittsburgh, Pa., has been assigned the Pittsburgh territory; Horace S. Bracken of Johnstown, Pa., the Johnstown territory; and R. W. Matthews of 770 Girard St. N. W., Washington, D. C., the District of Columbia.

In order to give A. M. Castle & Co., its west coast agent, the assistance of a local direct mill representative The Babcock & Wilcox Tube Co. has appointed Fritz Hoving its west coast district sales manager. Mr. Hoving will make his headquarters with A. M. Castle & Co. at 2200-2300 E. 55th St., Los Angeles, and will maintain active touch with the offices of that company in San Francisco and Seattle.

The Poole Foundry & Machine Co., Baltimore, Md., announce the appointment of the Rockfield-Davis Equipment Co., Denver, Colo., as representative in Colorado, Wyoming and New Mexico, carrying a complete line of Poole flexible couplings in stock for distribution in their territory.

Chain Belt Co. has recently appointed a new distributor in the Cleveland territory to handle its line of concrete mixers, pumps, and other construction equipment. The company selected is the Peden Machinery Co., and it will handle the territory previously taken care of by Hibbard-Eichman-Smith Co., Inc.

*Dust Content of the Atmosphere in Industry**

By J. J. BLOOMFIELD
Sanitary Engineer,
U.S. Public Health Service

THE abundant evidence at hand showing that the inhalation of certain industrial dusts is an important factor in the causation of pulmonary disease has emphasized the significance of the quantitative aspects of this problem. A knowledge of the dust content of the industrial atmosphere is required not only for the purpose of determining the extent of the hazard involved in various manufacturing processes, but is also useful in measuring the efficiency of protective devices which may be used in the elimination of the dust hazard. The properties of a given dust which determine its capacity to produce pulmonary pathology are the nature of the dust, that is, its chemical and mineralogical composition, its particle size, and, finally, the quantity of the dust dispersed in the atmosphere.

One of the outstanding results of the last twenty years of research in the field of dust inhalation is the demonstration of the fact that, in general, the degree of health hazard associated with the inhalation of any dust, all other factors remaining constant, is dependent upon the mineralogical composition of the dust. For example, it is now well established that the inhalation of certain types of dust, such as granite dust, will in time produce fibrosis of the lungs, at times associated with tuberculosis. In other cases exposure to dust may result in the production of much less fibrosis without notable tendency towards subsequent tuberculosis; this is true of cement dust. And, finally, there are certain types of dust, as typified by marble dust, which, in the quantities and lengths of exposure so far observed, produce little lung fibrosis. In general it has been found that those dusts which are high in quartz content are the ones which produce a disabling fibrosis of the lungs most readily. Hence, the necessity for knowledge concerning the chemical and mineralogical composition of a dust is obvious.

So far as the size of the dust particles is concerned, it is apparent that in order for any given dust to produce injury to the lung it must gain access to the parenchyma of the lung, the site where the harmful effects of the dust take place. It is known that not all the particles of inhaled dust gain access to or are retained by the human lung. In this connection it is of importance to have regard to the size of the dust particles present in the industrial atmosphere.

With reference to the quantity of dust present in the air of a workroom it is apparent that when the dust concentration is high, the exposed person will inhale a greater quantity in a given period of time than he will when the dust concentration of the atmosphere is relatively low, and since the rate of production of the fibrosis is partially dependent upon the rate at which the dust is inhaled, this latter item plays an important **rôle** in predicting the relative danger of different environments. Hence, the need for the evaluation of the quantity of dust in the industrial atmosphere is obvious.

Research on the problem of industrial-dust inhalation has indicated that, so far as their fibrosis-producing qualities are concerned, dusts may be divided into three groups: (1) those composed completely of combined silica, that is silicates, such as pure asbestos; (2) those containing free silica in the crystalline form known as quartz, (granite contains approximately 35 per cent. of quartz); and (3) dusts containing free silica in a non-crystalline form such as diatomaceous earth. In general it has been found that the harmfulness of a quartz-containing dust is in direct proportion to its quartz content. For this reason, in attempting to evaluate the harmfulness of a dust, it is of the utmost importance to ascertain its exact mineralogical composition. It has been our experience that to determine accurately the exact mineralogical composition of a dust one should resort to a combined chemical and petrographic analysis. It is our practice to have such an analysis made by an expert in petrographic geology. By no other method have we found it possible to determine the amount of quartz present in a given sample. In certain instances, such as when one is dealing with a mixture of quartz and pure potash feldspar, it is possible to determine the amount of quartz present in such dust merely by a chemical analysis. However, most dusts which come into question are mixtures of quartz and silicates. Take granite for an example. The average granite is made up chiefly of three minerals in about the following proportions: feldspar, 60 per cent.; quartz, 30 per cent.; and mica, 15 per cent. Chemical analysis shows that this average granite contains 70 per cent. of silica. Of this 70 per cent., 30 per cent. is present as quartz (free silica) and the other 40 per cent. is present as combined silica, in chemical combination with the other minerals that make up granite. It is possible to determine these proportions only with the aid of the petrographic microscope.

We find in practice that samples of dust settled out of the atmosphere at the breathing level of the worker serve admirably for both chemical and mineralogical determinations. The table presents the quartz content of dusts obtained in various industries which we have studied.

PERCENTAGE OF QUARTZ PRESENT IN VARIOUS INDUSTRIAL DUSTS

Kind of Dust	Percentage of Quartz
Rock-drilling dust (bitum. coal mine)	54.0
Granite-cutting dust	35.2
Rock-drilling dust (anthr. coal mine)	31.0
Brass-foundry dust	19.0
Dust from raw mills in cement plant.	6.5
Slate-mill dust (Vermont red slate)	3.0
Silverware polishing dust	1.7
Anthracite-coal dust	1.5
Bituminous-coal dust	1.2
Cement dust	1.0
Slate-mill dust (Vermont green slate)	trace
Talc-mill dust	none
Marble-cutting dust	none

It is evident from this table that rock-drilling occupations in the coal-mining industry and certain occupations in the granite-cutting industry and in brass foundries would be in the hazardous class as judged by the proportions of quartz in the atmosphere.

It has been demonstrated that particles of a size greater than 10 to 12 microns in longest dimension are very seldom found in the lungs. This absence of larger particles is partly due to the fact that the numbers of such particles greater than 10 microns in size present in industrial air is, as compared with the smaller sizes, comparatively small; furthermore, these larger particles do not penetrate to the terminal portions of the respiratory tract. Hence, we need concern ourselves only with those dust particles that are less than 10 microns in longest dimension.

In order to ascertain whether or not an industrial dust is capable of gaining access to the lungs it is necessary to know something of the size of the particles in the dust under consideration. In practice the samples for particle-size studies may be obtained by the use of the Owens jet dust counter. The advantage of this instrument over other devices is that the Owens apparatus projects the atmospheric dust in unaltered condition directly on a microscope cover-slip. This cover-slip may then be properly mounted and

* Abstracted from an address before the Industrial Health Section, 21st Annual Safety Congress.

examined by any one of several methods. Such samples may be studied microscopically, using a magnification of 1,000 diameters (oil-immersion objective) and the horizontal diameter of a representative number of particles measured by means of a calibrated filar ocular micrometer. In another method a microphotograph of the dust is made at a high magnification (1,500 to 2,500 diameters); from this either an enlarged print (10,000 diameters) may be made or the negative may be enlarged by means of a stereopticon to 20,000 or 25,000 diameters. The particles revealed on the enlarged print or screen may be measured by means of a millimeter scale.

According to Green, in order to obtain good microphotographs there are three essential conditions to be considered upon microscopic observation. These are: (1) the particles should be in one plane; (2) they should be free from Brownish movement; and (3) they should be well dispersed, showing individual particles instead of aggregates. Much of the work on the particle size of dusts by the photographic method reported in the literature has been on dusts of fairly uniform size, so that in the past it has not been difficult to fulfill the first condition; namely, that the particles should be in one plane. With industrial dust suspensions, however, one finds a variation in particle size from less than 0.5 micron to more than 10 microns in diameter. It is quite conceivable that with such dusts the microphotographic method may not lend itself to an accurate particle-size study. To date we have had but little experience with this method as applied to industrial-dust suspensions in air, nor is there any information on this subject in the literature.

No matter which method one uses for particle-size measurement the results may be treated in the customary manner. The particles may be grouped in classes according to size, from which a percentage distribution curve is easily obtained. A study has been made of the particle-size distribution of talc dust from the air of a workroom in which talc was being ground to a very fine state of subdivision. The measurements, from which the data were obtained, were made by means of a filar ocular micrometer at a magnification of 1,000 diameters. With this magnification it is possible to measure particles as small as 0.5 micron in diameter, while particles smaller than 0.5 micron are easily distinguished at this magnification and their presence recorded. Since by this technique we are able to measure accurately all particles down to 0.5 micron and since, in addition, we record those smaller than 0.5 micron, it is felt that the filar micrometer method (at 1,000-diameter magnification) fulfills the essential requirements of our problem.

An examination of the talc-dust data shows that only 16 per cent. of the particles were found to be less than 1 micron, the major portion (65 per cent.) being between 1 micron and 2.5 microns in size, while the median size of the dust particles was found to be 1.5 microns.

The writer feels that, from the practical hygienic viewpoint, the particle count is at present the best quantitative index of the degree of atmospheric pollution. The decision as to the size range of the particles which should be included in the dust count is a question requiring careful consideration. Obviously, the size of the smallest visible particle will depend on the magnification and type of illumination used in the microscope, the refractive properties of the dust and, to some extent, on the visual acuity of the observer. We must bear in mind that our chief interest in this problem is in the industrial hygienic aspect. Primarily we are interested in differentiating between the dust content in ordinary normal atmospheres, not known to be harmful, and certain industrial dusts which are known to be associated with lung damage. This difference is sharply marked so far as the dust particles between approximately 0.5 micron and 10 microns in diameter are concerned; but the difference between such normal and abnormal air is masked and lost when we include in our determination the particles of ultramicroscopic size which are present in vast numbers in all air.

So far as the upper limit of particle size is concerned it has been demonstrated by the South African studies that particles greater than 10 microns in longest dimension are, as a rule, of negligible importance. The data concerning the lower size limit of potentially-hazardous dust is not so conclusive. Data which throw some light on this point are to be found in the work of Moir, of South Africa, who examined microscopically 120 dust particles obtained from two specimens of silicotic lung and found that only 13 per cent. of the particles were less than 0 5 micron and about 36 per cent. of the particles were less than 1 micron in diameter. The majority of the particles (60 per cent.) were between 1 micron and 3 microns in size. The median size of the dust was found to be 1.2 microns in diameter. Practically the same results were obtained by Watkins-Pitchford, who examined and measured the silica particles in sections of silicotic lungs illuminated by polarized light. Drinker, in comparing the size-frequency of the particles measured by Moir with the particles measured by him of the dust found in the sputum of men employed in ore mills, found a close correspondence. The findings of Moir and Watkins-Pitchford have also been corroborated by Mavrogordato, who examined dust, both with light- and dark-ground illumination, in sections of human and animal silicotic lungs as well as the dust recovered from these lungs. As a result of his work and that of his colleagues in South Africa, Mavrogordato says: "In the damaged lungs, as far as simple silicosis is concerned, the lesions are discreet, localized, and associated with visible particles; whereas, if the ultramicroscopical particles were an important agent, one would expect the simple disease to be generalized and to show no particular association between lesions and visible particles."

In connection with the lower limit of particle-size of dust of pathologic significance the following pertinent question arises. Aside from the evidence direct or indirect of the non-retention of minute particles of dust by the lungs, what evidence is there that appreciable percentages of ordinary industrial dusts ever fragment into those minute sizes less than 0.5 micron in diameter? It is a well-known fact that in most of the fine-grinding operations in use to-day, such as in the preparation of paint pigments, considerable energy must be expended to obtain a product, the particle-size of which is less than 0.5 micron in average diameter, and this not in an industry where dust is an evil by-product but where finely-divided dust is the chief aim of the whole industrial process.

The best answer to the question just raised, namely: what is the particle-size distribution of industrial dust, would be data of actual measurements of such dust. Unfortunately we have but scant published data on the particle-size frequency of dusts in the air of industrial establishments. In 1929, Fehnel made some particle-size measurements in connection with a dust study of hard-rock drilling in New York City. As a result of his study, Fehnel reported the findings on three samples, which showed the dust which was less than 1 micron in size to vary from 1 to 15 per cent. Most of the dust in these hard-rock drilling operations was, according to Fehnel, between 2 and 5 microns in size.

In a particle-size study of 25 samples of 11 different kinds of aërial industrial dusts made by the filar micrometer method at a magnification of 1,000 diameters, the writer found that practically all the dust was less than 5 microns in size. Only 2 per cent. of the particles were less than 0.5 micron, 21 per cent. were less than 1 micron, and the majority of the dust (71 per cent.) was found to be between 1 micron and 3 microns in diameter. From all the evidence just presented, and in the absence of conclusive proof to the contrary, it is apparent that we need only be concerned with those dust particles between 0.5 micron and 5 microns in size and, from a practical standpoint, the lower limit of particle size to be counted may well be taken at about 1 micron. The method of dust counting which we have been using for the past fourteen years is capable of revealing particles as small as 1 micron quite readily.

Eighteen tons per hour from a No. 19 Crusher—100% through three-eighth inch opening using less than fifteen horsepower

THE following is the result of a test on a No. 19 Kennedy Ball Bearing Gearless Crusher.

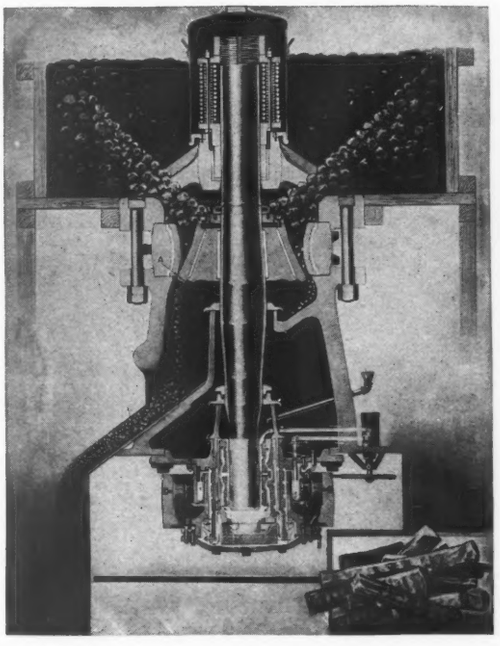
Exceedingly hard glacial gravel, 1½" and plus ⅜", was crushed for sand for concrete purposes, and less than fifteen horsepower was used.

The same crusher can be opened up and 1½" stone can be produced at a rate of from 30 to 50 tons per hour.

With the opening set to ⅛" on the closed side the following results were obtained:

Minus ⅜"	100 %
Plus 3 mesh	21½%
Minus 3—Plus 4	17 %
Minus 4—Plus 14	36½%
Minus 14—Plus 48	15 %
Minus 48—Plus 100	4 %
Minus 100	5½%

This was crushed at the rate of 18 tons per hour.



Built in various sizes with receiving openings from 1¾" to 14". Produces sizes from ⅛" to 3", with capacities up to 620 tons per hour on the larger sizes.

The Kennedy Ball Bearing Gearless Gyratory Crusher is guaranteed to do more crushing, size for size, of any given material, with less power consumption, than any crusher ever built. 90% Of the power input to motor is applied direct to breaking the rock between head and concaves. The head and shaft of the type "S" crusher is suspended on springs to permit tramp steel to pass through. The ball-and-socket eccentric is self-aligning. This crusher may be operated by a synchronous motor, built in the pulley of the crusher, or by belt from standard motor. This crusher takes one-half the power required for a geared crusher, and saves 80% in the cost of maintenance.

We manufacture a complete line of primary jaw and gyratory crushers, ball mills, rod mills, screening, elevating, and conveying equipment, etc. Complete information describing any or all of this machinery will be sent on request. *Send for latest information on our vibrating screen.*

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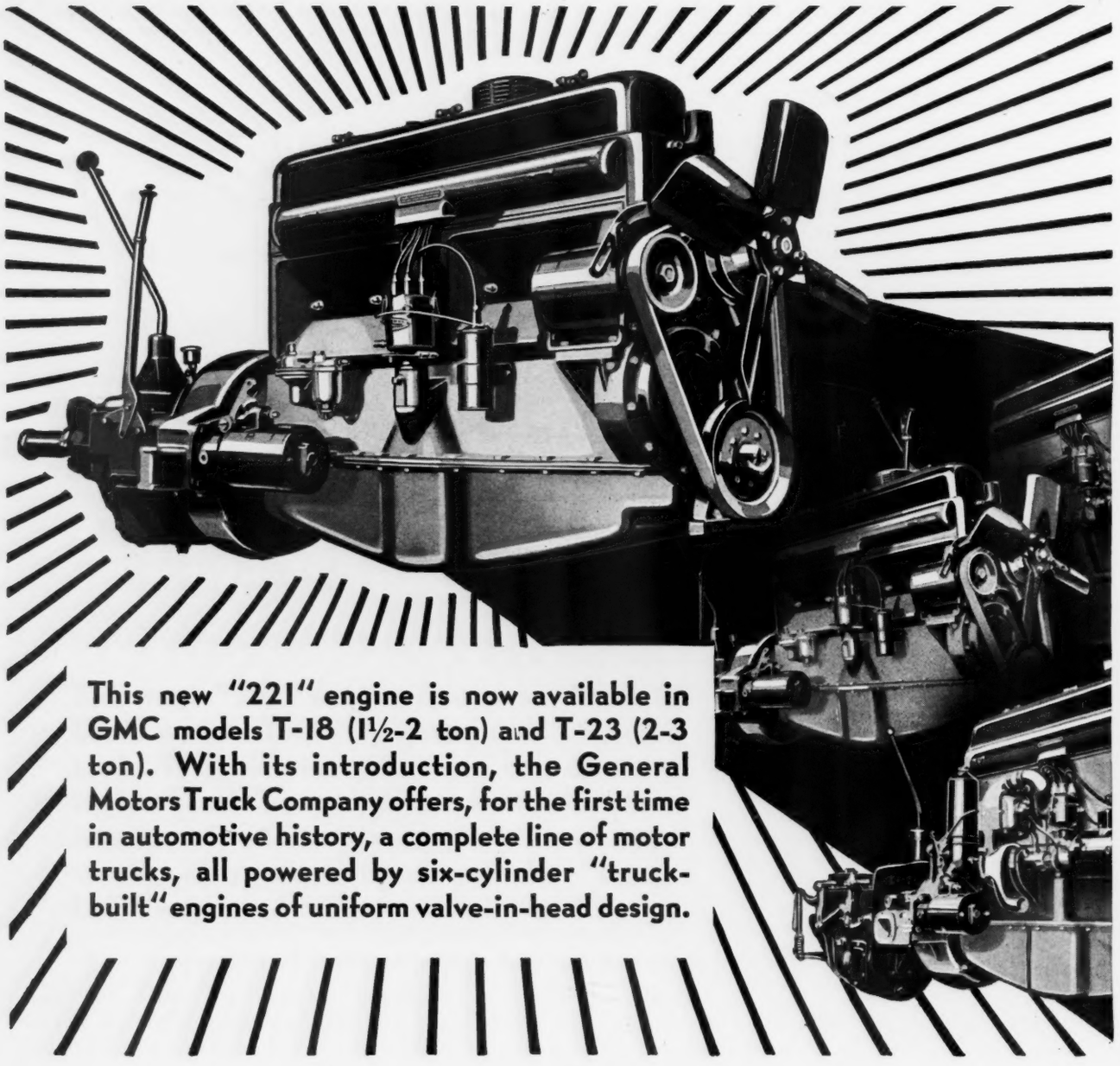
BRANCH OFFICES:—Chicago: 120 South La Salle St. Birmingham, Ala.: Comer Building. Los Angeles, Calif.: 414 South Spring St. London, England: Bush House. Paris, France: 40 Rue des Mathurins. Johannesburg, S. Africa: 73 Cullinan Bldg. Canadian Agents, Canadian Fairbanks-Morse Co., 980 St. Antoine St., Montreal, Que. Walkers Limited, Maryborough, Queensland, Australia. Cuban Agents, Gerard Jansen Y Cia. Compostela 43, Havana, Cuba.



This new "221" engine is now available in GMC models T-18 (1½-2 ton) and T-23 (2-3 ton). With its introduction, the General Motors Truck Company offers, for the first time in automotive history, a complete line of motor trucks, all powered by six-cylinder "truck-built" engines of uniform valve-in-head design.

Features of the 1933 Engine Line

Eight great engines are pictured on this page. They range in cubic inch displacement from 221 to 707; in horsepower, from 69 to 173; and in torque, from 155 to 550 ft. lbs. They are uniform in design, uniform in the standards to which they are built, uniform in their ideal graduation of size and power; and they also possess in common, one great outstanding characteristic—unsurpassed engine efficiency—because every 1933 GMC engine provides more sustained torque per cubic inch displacement than does any other truck engine built.

Contributing to this spectacular achievement are many features of advanced engineering design and construction.

But only an actual demonstration can tell you how much these improvements will mean to you. Get that demonstration today!

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General Motors Truck Co. *(A Subsidiary of Yellow Truck & Coach Mfg. Co.)* *Time Payments Available*

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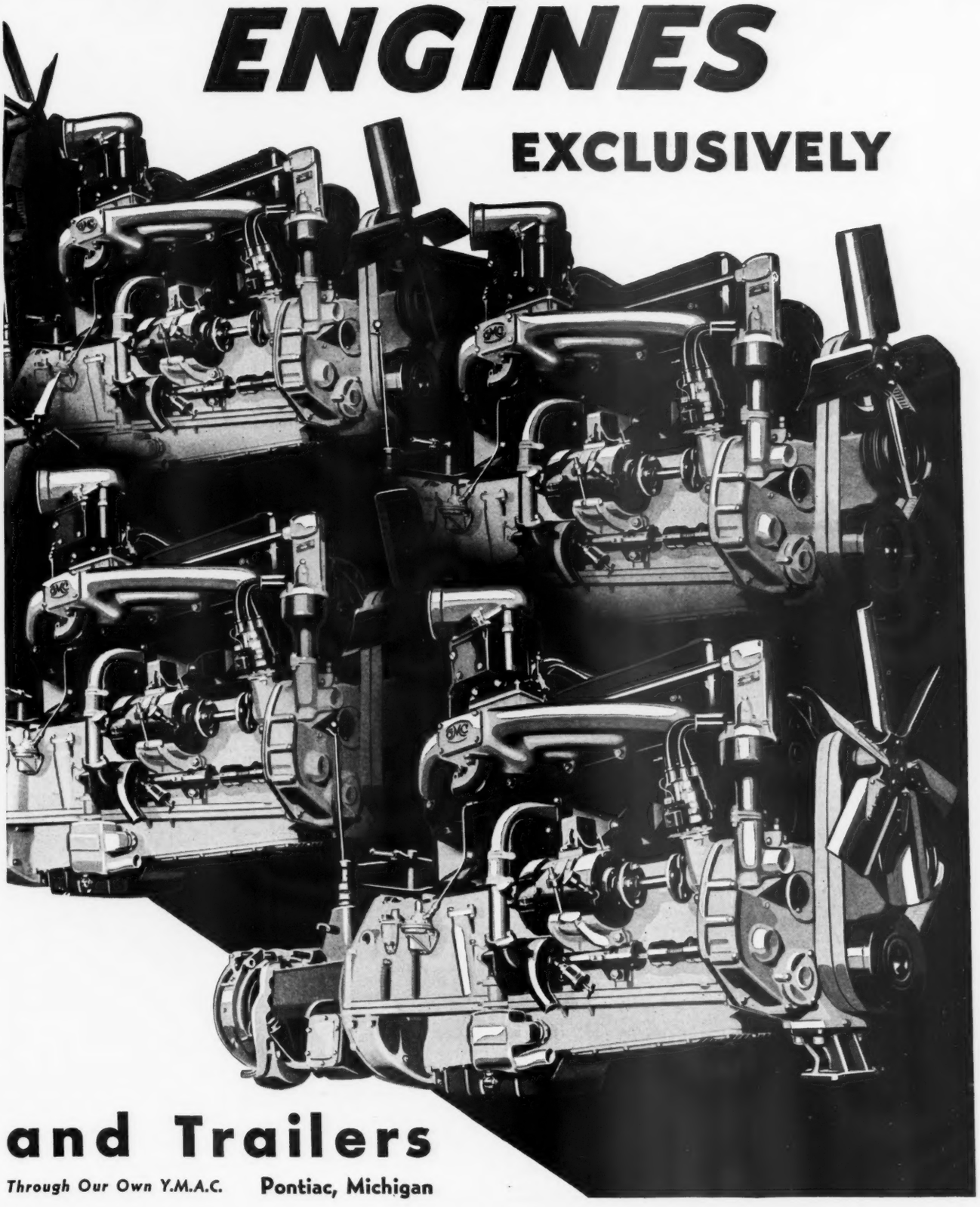
"TRUCK GMC BUILT"

ENGINES

EXCLUSIVELY



and Trailers

Through Our Own Y.M.A.C. Pontiac, Michigan

Classified Buyers' Guide

A Directory of PIT AND QUARRY Advertisers Arranged According to Product

Although every effort is made to insure accuracy and completeness in these listings, the publisher cannot accept responsibility for errors or omissions. Any mistakes discovered will gladly be rectified, if brought to the attention of the Advertisers' Service Department.

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Agitating Ladders (Dredge)
Eagle Iron Works

Agitators, Thickeners and Slurry Mixers
Traylor Eng. & Mfg. Co.

Air Compressors
Traylor Eng. & Mfg. Co.

Air Separators
Bradley Pulverizer Co.
Gay, Rubert M.
Gruendler Crusher and Pulverizer Co.
Universal Road Machinery Co.

Ash and Refuse-Handling Equipment
Allen Sherman Hoff Co.
Haiss Mfg. Co., Geo.

Asphalt
Standard Oil Co. (Indiana)

Backfillers
Austin-Western Road Mchy. Co.

Balls (Grinding)
Kennedy-Van Saun Mfg. and Eng. Corp.

Balls (Tube-Mill, etc.)
Kennedy-Van Saun Mfg. and Eng. Corp.
Fried. Krupp Grusonwerk A.-G.

Bearings (Anti-Friction)
S K F Industries, Inc.

Bearings (Ball)
S K F Industries, Inc.

Bearings (Roller)
S K F Industries, Inc.

Belt Drives
Chain Belt Co.

Belt Fasteners
Flexible Steel Lacing Co.

Belting
Goodyear Tire & Rubber Co., Inc.
Haiss Mfg. Co., Geo.
New York Belting and Packing Co.

Belt Lacing
Flexible Steel Lacing Co.

Bin Gates
Allen Sherman Hoff Co
Chain Belt Co.
Haiss Mfg. Co., Geo.
Kennedy-Van Saun Mfg. and Eng. Corp.
McLanahan and Stone Corp.
Morrow Mfg. Co.
Smith Engineering Works
Traylor Eng. & Mfg. Co.

Bins (Cast Iron)
Allen Sherman Hoff Co.

Bins (Steel)
Austin-Western Road Mchy. Co.
Kennedy-Van Saun Mfg. and Eng. Corp.
McLanahan and Stone Corp.

Blast-Hole Drills (See Drills—Blast-Hole)

Blasting Machines
Hercules Powder Co.

Blasting Supplies
Ensign-Bickford Co.
Hercules Powder Co.

Bodies (Motor Truck, Concrete Mixing)
Jaeger Machine Co.

Borings, Core
Pennsylvania Drilling Co.
Sprague and Henwood Inc.

Braces (Track) (See Track Braces)

Bronze Work (Ornamental)
National Wire Cloth Co.

Bucket Elevators (See Conveyors and Elevators)

Buckets (Clamshell, Orange-Peel, Etc.)
Haiss Mfg. Co., Geo.

Buckets (Elevator and Conveyor)
Chain Belt Co.
Cross Engineering Co.
Haiss Mfg. Co., Geo.
McLanahan and Stone Corp.
Smith Engineering Works

Cableways
American Steel & Wire Co.
Roebling's Sons Co., John A.

Caps (Blasting)
Hercules Powder Co.

Capstans (See Winches and Capstans)

Carriers
Smith Engineering Works

Cars (Quarry and Gravel Pit)
Austin-Western Road Mchy. Co.

Car Wheels—(See Wheels—Car)

Castings
Chain Belt Co.
Eagle Iron Works
Kennedy-Van Saun Mfg. and Eng. Corp.
McLanahan and Stone Corp.

Cement Pumps (See Pumps; Air Pumps; Pumps, Cement Slurry; Pumps, Bulk Cement)

Chain Drives
Chain Belt Co.

Chain (Elevating and Conveying)
Chain Belt Co.
Cross Engineering Co.
Haiss Mfg. Co., Geo.

Chutes and Chute Liners
Cross Engineering Co.
Goodyear Tire & Rubber Co., Inc.
McLanahan and Stone Corp.
Morrow Mfg. Co.
New York Belting and Packing Co.

Clamshell Buckets (See Buckets—Clamshell, Orange-peel, etc.)

Clamshell Gates (See Gates-Clamshell)

Classifiers
Bradley Pulverizer Co.
Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machine Co.

Clips (Wire Rope)
American Steel & Wire Co.
Roebling's Sons Co., John A.

Coal-Pulverizing Equipment
Bradley Pulverizer Co.
Gay, Rubert M.
Kennedy-Van Saun Mfg. and Eng. Corp.
Universal Road Machinery Co.

Compressors (See Air Compressors)

Cones (Sand-Washing)
Smith Engineering Works

Conveyor Belting (See Belting)

Conveyor Idlers and Rolls
Chain Belt Co.

Conveyors and Elevators
Allen Sherman Hoff Co.
Cross Engineering Co.
Gruendler Crusher and Pulverizer Co.
Haiss Mfg. Co., Geo.
Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machinery Co.
McLanahan and Stone Corp.
Morrow Mfg. Co.
Smith Engineering Works
Traylor Eng. & Mfg. Co.
Universal Road Machinery Co.

Conveyors (Ready-Mixed Concrete)
Chain Belt Co.
Jaeger Machine Co.

Coolers (See Kilns and Coolers—Rotary)

Couplings (Flexible and Shaft)
Erie Pump and Engine Works

Cranes (Crawler and Locomotive)
Austin-Western Road Mchy. Co.
Bay City Shovels, Inc.
Ohio Power Shovel Co.

Crusher Parts
American Pulverizer Co.
Kennedy-Van Saun Mfg. and Eng. Corp.
McLanahan and Stone Corp.

Crushers (Cone)
Nordberg Mfg. Co.

Crushers (Hammer)
American Pulverizer Co.
Austin-Western Road Mchy. Co.
Gruendler Crusher and Pulverizer Co.
Kennedy-Van Saun Mfg. and Eng. Corp.

Crushers (Jaw and Gyratory)
Austin-Western Road Mchy. Co.
Gruendler Crusher and Pulverizer Co.
Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machinery Co.
Nordberg Mfg. Co.
Smith Engineering Works
Traylor Eng. & Mfg. Co.
Universal Road Machy. Co.

Crushers (Ring)
American Pulverizer Co.

Crushers (Roll)
American Pulverizer Co.
Austin-Western Road Mchy. Co.
Gruendler Crusher and Pulverizer Co.
Kennedy-Van Saun Mfg. and Eng. Corp.
McLanahan and Stone Corp.

Crushers (Rotary)
American Pulverizer Co.
Austin-Western Road Mchy. Co.

Crushing Rolls
Allis-Chalmers Mfg. Co.
Austin-Western Road Mchy. Co.
Kennedy-Van Saun Mfg. and Eng. Corp.
McLanahan and Stone Corp.
Traylor Eng. & Mfg. Co.

Detonators
Hercules Powder Co.

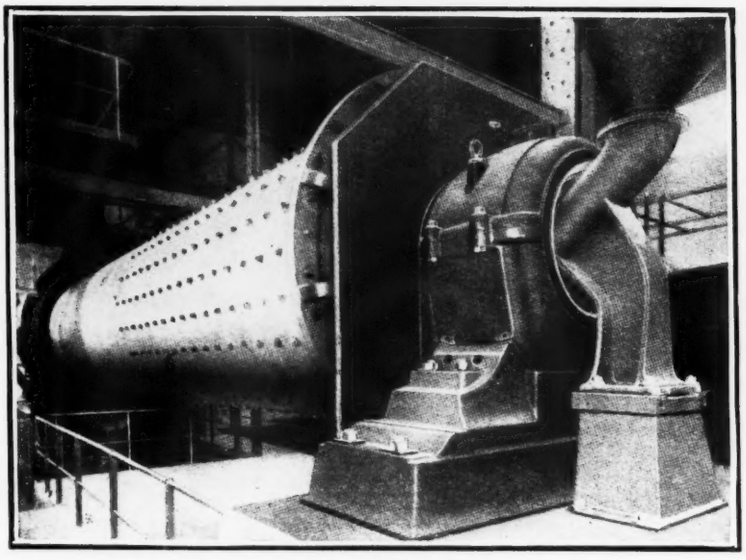
Diesel Engines (See Engines—Diesel)

Dippers and Teeth (Power Shovel)
Bay City Shovels, Inc.

Dragline Excavators
Austin-Western Road Mchy. Co.
Bay City Shovels, Inc.
Ohio Power Shovel Co.

KRUPP.

Three-Compartment Tube Mill in a Cement Factory



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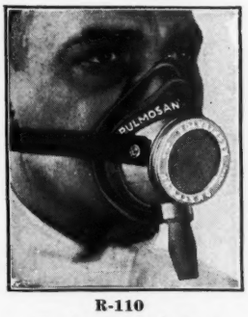

R-110
Dustpruf Respirator

Most popular for protection against fine dusts. Weight, 2½ oz. Comfortable, adjustable, easy breathing.

. . . that keep down your accident figures!

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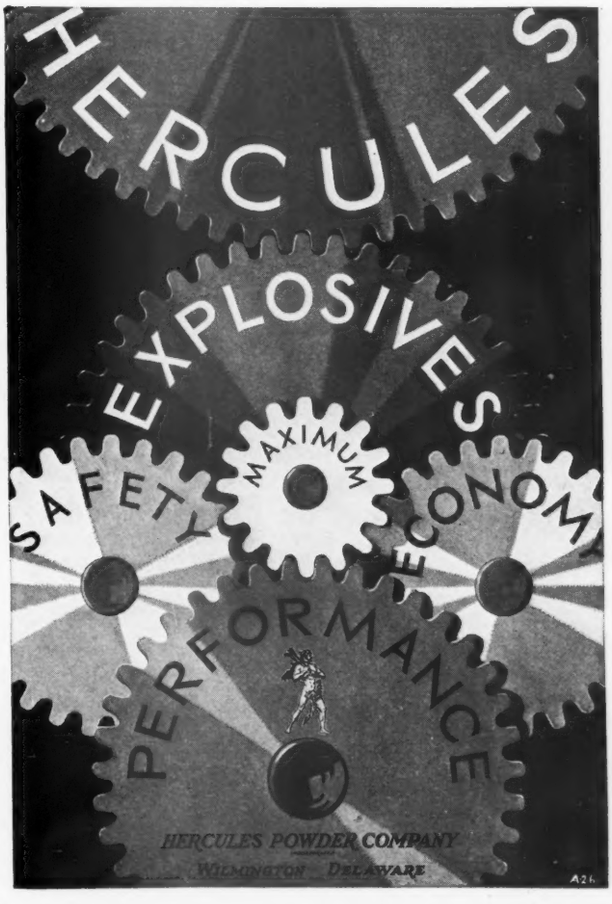
Safety Goggles
Non-Shatterable
All Kinds

Everything for Industrial Safety

Write for Safety literature and prices

Pulmosan Safety Equipment Corp.
176 Johnson St., Brooklyn, N. Y.



Classified Buyers' Guide

A Directory of Pit and Quarry Advertisers Arranged According to Product

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Dredge Pipe (See Pipe)

Dredges
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Drilling Accessories
Loomis Machine Co.

Drilling Contractors
Pennsylvania Drilling Co.
Sprague and Henwood Inc.

Drills (Blast-Hole)
Loomis Machine Co.

Drills, Diamond
Pennsylvania Drilling Co.
Sprague and Henwood Inc.

Drills (Rock)
Loomis Machine Co.

Drills (Well) (See Drills—Blast-Hole)

Drives (Multiple Belt, Chain, Rope)
Chain Belt Co.

Dryers
Kennedy-Van Saun Mfg. and Eng. Corp.
Fried. Krupp Grusonwerk A.-G.
Lewistown Fdry. & Mach. Co.
McLanahan and Stone Corp.
Traylor Eng. & Mfg. Co.

Dust-Collecting Systems
Allen Sherman Hoff Co.

Dust Handling Systems (Hydro Vacuum)
Allen Sherman Hoff Co.

Dust Hoods and Helmets
Pulmosan Safety Equipment Co.

Dynamite (See Explosives)

Elevator Belting (See Belting)

Elevators (See Conveyors and Elevators)

Engineers
Cross Engineering Co.
Kennedy-Van Saun Mfg. and Eng. Corp.
McLanahan and Stone Corp.

Engines (Diesel)
McIntosh & Seymour Corp.
Nordberg Mfg. Co.

Engines (Internal-Combustion)
McIntosh & Seymour Corp.
Nordberg Mfg. Co.

Engines (Steam)
Morris Machine Works
Nordberg Mfg. Co.

Excavating Machinery (See Shovels; Cranes; Buckets; etc.)

Excavators—Shallow Grading (Bucket Elevator Type)
Haiss Mfg. Co., Geo.

Explosives
Hercules Powder Co.

Fans (Exhaust)
Kennedy-Van Saun Mfg. and Eng. Corp.

Feeders
Chain Belt Co.
Kennedy-Van Saun Mfg. and Eng. Corp.
Morrow Mfg. Co.
Smith Engineering Works

Floor Sweeping Systems (Hydro Vacuum)
Allen Sherman Hoff Co.

Fuses (Detonating)
Ensign-Bickford Co.
Hercules Powder Co.

Gaskets
Goodyear Tire & Rubber Co., Inc.
New York Belting and Packing Co.

Gasoline
Standard Oil Co. (Indiana)

Gasoline Engines (See Engines—Internal-Combustion)

Gates (Bin) (See Bin Gates)

Gates (Clamshell)
Haiss Mfg. Co., Geo.

Gears and Pinions
Chain Belt Co.
Haiss Mfg. Co., Geo.

Gears (Herringbone)
Chain Belt Co.

Gelatin (See Explosives)

Generators (See Motors and Generators)

Glass Sand Equipment
Lewistown Foundry & Machine Co.

Goggles
Pulmosan Safety Equipment Co.

Grab Buckets (See Buckets—Clamshell, Orange-Peel, etc.)

Greases
Standard Oil Co. (Indiana)

Grinding Balls (See Balls, Grinding)

Grizzlies
Eagle Iron Works
Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Fdy. & Mach. Co.
Smith Engineering Works
Traylor Eng. & Mfg. Co.
Universal Road Machy. Co.

Guards (Wire)
National Wire Cloth Co.

Guns (Hydraulic)
Georgia Iron Works

Hammer Mills (See Crushers—Hammer)

Hoists
McLanahan and Stone Corp.
Smith Engineering Works

Hose (Air, Steam and Water)
Goodyear Tire & Rubber Co., Inc.
New York Belting and Packing Co.

Hose Couplings (See Couplings)

Hydraulic Guns (See Guns—Hydraulic)

Idlers
Chain Belt Co.
Smith Engineering Works

Kilns and Coolers (Rotary)
Kennedy-Van Saun Mfg. and Eng. Corp.
Fried. Krupp Grusonwerk A.-G.
Traylor Eng. & Mfg. Co.

Lime Kilns
Kennedy-Van Saun Mfg. and Eng. Corp.
Fried. Krupp Grusonwerk A.-G.

Linings (Ball- and Tube-Mill) (See Mill Liners and Linings)

Loaders and Unloaders
Haiss Mfg. Co., Geo.

Locomotives (Electric, Gas and Steam)
Lima Locomotive Works

Lubricants
Standard Oil Co. (Indiana)

Mill Liners and Linings
Kennedy-Van Saun Mfg. and Eng. Corp.
New York Belting and Packing Co.

Mills (Grinding) (See also Crushers—Hammer)
American Pulverizer Co.
Bradley Pulverizer Co.
Kennedy-Van Saun Mfg. and Eng. Corp.
Fried. Krupp Grusonwerk A.-G.
Lewistown Fdy. & Mach. Co.
Traylor Eng. & Mfg. Co.

Motors (Internal-Combustion) (See Engines — Internal-Combustion)

Motor Trucks
General Motors Truck Co.

Nails
American Steel & Wire Co.

Nozzles (Hydraulic) (See Guns—Hydraulic)

Oils (Graphite)
Standard Oil Co. (Indiana)

Oils (Motor)
Standard Oil Co. (Indiana)

Packing
Goodyear Tire & Rubber Co., Inc.
New York Belting and Packing Co.

Partitions (Wire)
National Wire Cloth Co.

Perforated Metal Plates
Chicago Perforating Co.
Cross Engineering Co.
Morrow Mfg. Co.

Pipe Flanges
Georgia Iron Works

Plug Valves (See Valves)

Pneumatic Drills (See Drills, Rock)

Portable Conveyors
Haiss Mfg. Co., Geo.

Portable Crushing and Screening Plants
Austin-Western Road Mchy. Co.

Portable Engines (See Engines—Internal Combustion)

Portable Loaders (See Loaders and Unloaders)

Power Cables (Rubber Clad)
American Steel & Wire Co.

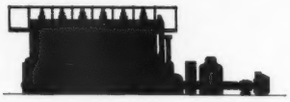
Power Shovels (See Shovels, Electric, Internal-Combustion and Steam)

Pulverized Fuel Systems
Gay, Rubert M.
Kennedy-Van Saun Mfg. and Eng. Corp.
Universal Road Machinery Co.

Pulverizers (See also Crushers; Mills; etc.)
American Pulverizer Co.
Austin-Western Road Mchy. Co.
Bradley Pulverizer Co.
Gruendler Crusher and Pulverizer Co.
Kennedy-Van Saun Mfg. and Eng. Corp.
Fried. Krupp Grusonwerk A.-G.
Lewistown Foundry & Machinery Co.

Pump Valves (See Valves, Pump)

Pumps (Cement Slurry)
Allen Sherman Hoff Co.
Morris Machine Works



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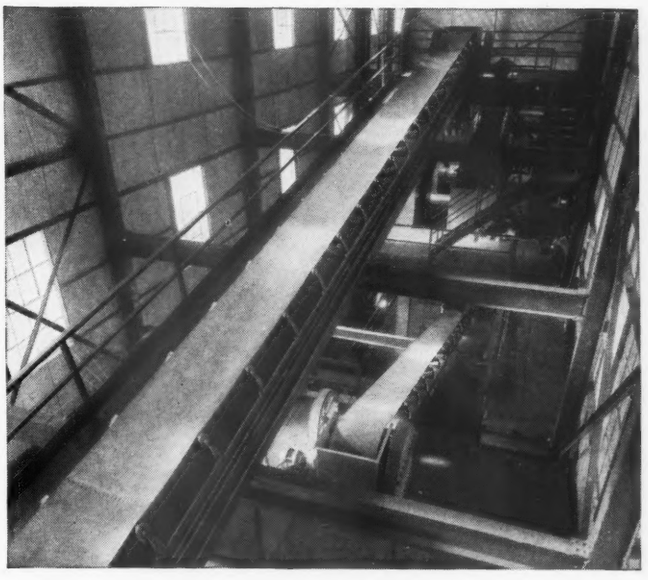

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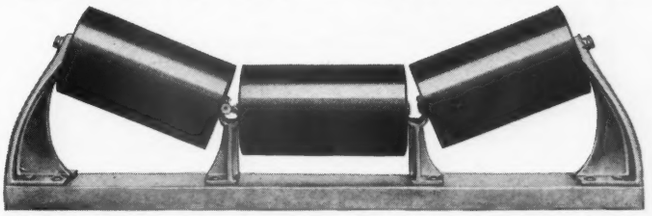

Established 1891—Branches or Representatives in all Principal Cities

Classified Buyers' Guide

A Directory of PIT AND QUARRY Advertisers Arranged According to Product

Index to Advertisers on Page 84

Pumps (Centrifugal)
Allen Sherman Hoff Co.
Chain Belt Co.
Erie Pump and Engine Works
Georgia Iron Works
Morris Machine Works

Pumps (Dredging)
Allen Sherman Hoff Co.
Erie Pump and Engine Works
Georgia Iron Works
Morris Machine Works

Pumps (Sand and Gravel)
Allen Sherman Hoff Co.
Erie Pump and Engine Works
Georgia Iron Works
Morris Machine Works

Purifiers, Steam (See Steam Purifiers)

Ready-Mixed Concrete Plants
Chain Belt Co.

Respirators
Pulmosan Safety Equipment Co.

Rock Drills (See Drills—Rock)

Rod Mills
Kennedy-Van Saun Mfg. and Eng. Corp.
Traylor Eng. & Mfg. Co.

Roller Bearings
See Bearings, Roller

Rope (Wire) (See Wire Rope)

Rubbish Burners
Cross Engineering Co.

Safety Equipment
Pulmosan Safety Equipment Co.

Sand Separators
McLanahan and Stone Corp.
Smith Engineering Works

Sand-Settling Tanks
Smith Engineering Works

Scrapers (Power Drag)
Austin-Western Road Mchy. Co.

Screens
Chain Belt Co.
Chicago Perforating Co.
Cross Engineering Co.
Deister Machine Co.
Eagle Iron Works
Gay, Rubert M.
Gruendler Crusher and Pulverizer Co.
Haiss Mfg. Co., Geo.
Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machinery Co.
McLanahan and Stone Corp.
Morrow Mfg. Co.
National Wire Cloth Co.
Roebling's Sons Co., John A.
Smith Engineering Works
Traylor Eng. & Mfg. Co.
Universal Road Machinery Co.

Screens (Vibrating or Shaking)
Austin-Western Road Mchy. Co.
Deister Machine Co.
Gay, Rubert M.
Gruendler Crusher and Pulverizer Co.
Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machinery Co.
McLanahan and Stone Corp.
Universal Road Machinery Co.

Separators (Air) (See Air Separators)

Sheaves
Chain Belt Co.
Eagle Iron Works
Gruendler Crusher and Pulverizer Co.
Haiss Mfg. Co., Geo.
McLanahan and Stone Corp.

Shovels (Electric, Internal Combustion and Steam)
Austin-Western Road Mchy. Co.
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Ohio Power Shovel Co.

Silos
Chain Belt Co.

Skip Hoists and Skips
Chain Belt Co.

Solvents (Carbon)
Standard Oil Co. (Indiana)

Speed Reduction Units
Chain Belt Co.

Spouts (See Chutes and Chute Liners)

Sprockets and Chain
Chain Belt Co.

Steel (Alloy)
Chain Belt Co.

Steel Grating (See Grating, Steel)

Steel Inclines (See Inclines, Steel)

Storage Equipment
Chain Belt Co.
Haiss Mfg. Co., Geo.

Sweeping Systems
Allen Sherman Hoff Co.

Tanks (Sand-Settling)
Morrow Mfg. Co.
Smith Engineering Works

Tools (Drill) (See Drilling Accessories)

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Nordberg Mfg. Co.

Trailers
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General Motors Truck Co.

Tramways (Aerial)
American Steel & Wire Co.
Roebling's Sons Co., John A.

Transmission Belting (See Belting)

Transmission Machinery
Chain Belt Co.
Gruendler Crusher and Pulverizer Co.

Trippers
Chain Belt Co.

Truck Cranes (See Cranes)

Truck Mixers
Chain Belt Co.
Jaeger Machine Co.

Trucks and Trailers (See Motor Trucks)

Tube-Mill Liners (See Mill Liners and Linings)

Tube Mills (See Mills—Ball, Tube, etc.)

Unloaders (Box Car)
Chain Belt Co.

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Chain Belt Co.

Vibrating Screen Plate
Chicago Perforating Co.
Cross Engineering Co.
Morrow Mfg. Co.

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Washers (Sand, Gravel, and Stone)
Eagle Iron Works
Haiss Mfg. Co., Geo.
Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machinery Co.
McLanahan and Stone Corp.
Smith Engineering Works
Traylor Eng. & Mfg. Co.
Universal Road Machinery Co.

Welding Supplies
American Steel & Wire Co.
Roebling's Sons Co., John A.

Well Drills (See Drills—Well)

Wheels (Car)
Eagle Iron Works

Winches and Capstans
Chain Belt Co.

Wire and Cable (Electric)
American Steel & Wire Co.
Roebling's Sons Co., John A.

Wire Cloth
National Wire Cloth Co.
Roebling's Sons Co., John A.

Wire Rope
American Steel & Wire Co.
Roebling's Sons Co., John A.
Williamsport Wire Rope Co.

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Roebling's Sons Co., John A.
Williamsport Wire Rope Co.

Wire Rope Slings
American Steel & Wire Co.
Roebling's Sons Co., John A.
Williamsport Wire Rope Co.

Wire (Welding)
American Steel & Wire Co.
Roebling's Sons Co., John A.

Worm Gears (See Gears and Pinions)

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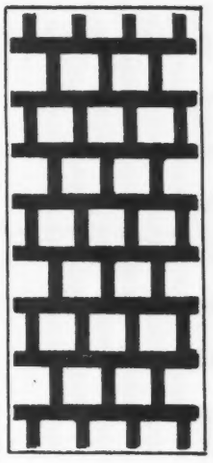

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New York Office, 114 Liberty St.
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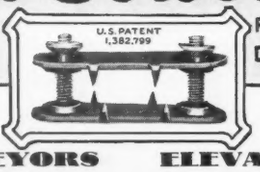

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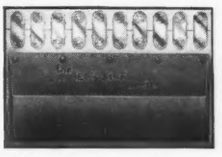

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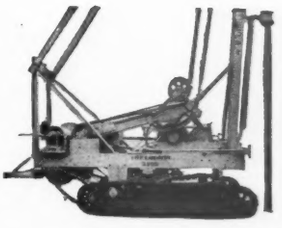

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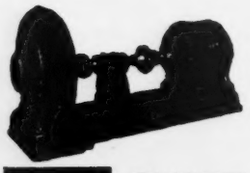

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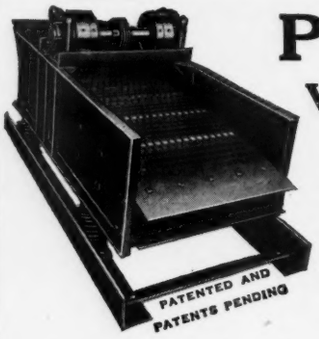

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- ☐Barges, steel
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- ☐Belt fasteners
- ☐Belting, conveyor and elevator
- ☐Belting, transmission
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- ☐Bins, concrete
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- ☐Car Pullers and Movers
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- ☐Couplings, Hose
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- ☐Trippers, Tramway
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- ☐Valves, Pump
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- ☐Welding Supplies
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- ☐Wire Cloth
- ☐Wire Cloth, Manganese Steel

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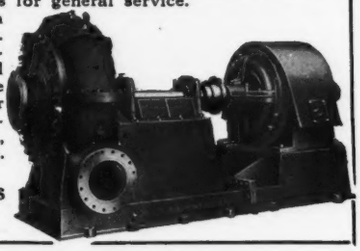

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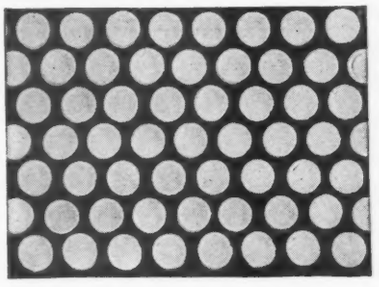

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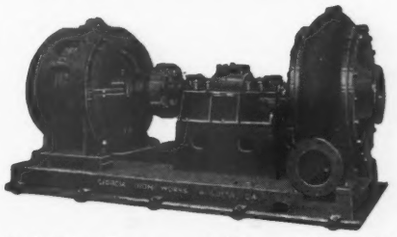

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1-200	Wsthse.	220/440	Sq. Cage	585
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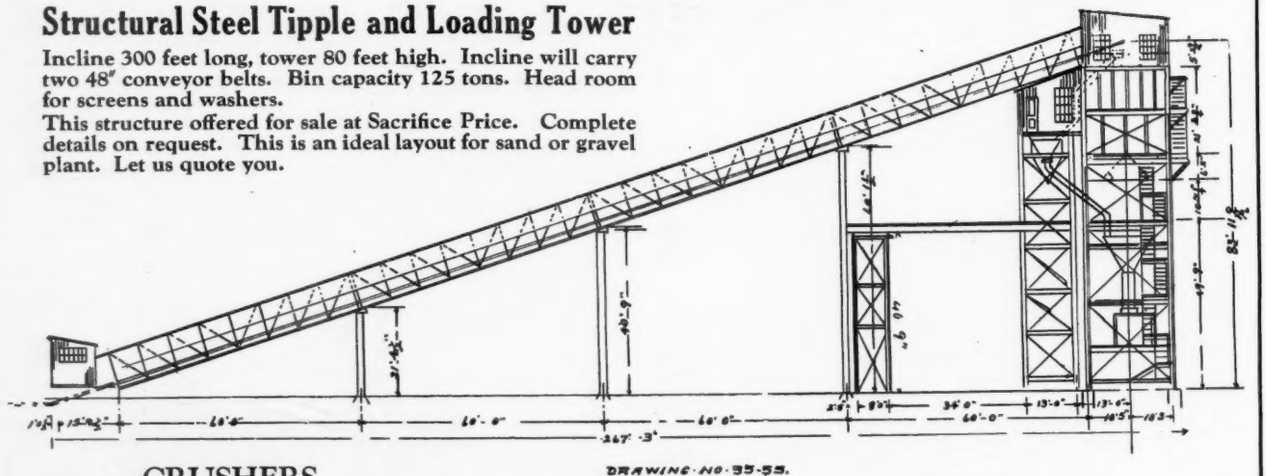

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1—120 ft. L-B Drag
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1—30" Belt, 83 ft. c-c.

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1—Ingersoll-Rand, after cooler type N K., 3030 ft. cap.

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4—Air Receivers: 1—Size 13x5 ft.; 1—Size 24 in. x 6 ft. 6 in.; 1—2½x6 ft. and 1—2x6 ft.

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4—1 cu.yd. mixing plants, with 1—117-ton Blaw-Knox Bin.
44—No. 28 Blaw-Knox Inundators; 4—No. 401 Batchers.
4—Fairbanks Cement Hopper Scales, 1000 lb. cap.
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BOILERS

2—Boilers: 1—30 hp. vert.; 1—Marion steam shovel, vert. boiler.

BOXES

30—Scale Boxes, 1½-yd. cap.

BUCKETS

4—Clamshell: 1—1-yd. Williams Hercules; 1—1-yd. Blaw-Knox Dreadnaught; 1—¾-yd. Williams Hercules; 1—1-yd. Williams Favorite.
1—Dragline Bucket, Page ¾-yd.
1—Orange Peel, Hayward 1 yd., extra heavy 3-leaf.
37—Steubner Controllable concrete bottom dump buckets: 32—2-yd. cap.; 5—1¼-yd. cap.; 7—1-yd. tipover and bottom dump.
3—Dragscraper buckets: 3—1-yd. Crescent buckets, complete with roller bearing sheaves.

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2—Western, Std. Ga., 12 cu.yd. cap., 2-way dump.
39—Koppel dump cars, 38—Std. Ga., 6-yd. cap.; 1—24-in. Ga., 1½-yd. cap., V-shaped.
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3—Marsh Capron: 1—28-S, 1 cu.yd. cap., gas powered; 1—21-S, ¾ cu. yd. cap.; 1—14-S, ½ cu. yd. cap.

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8—"Screw" conveyors: 4—14-in. conveyors, and 4—12 in. x 12 ft. long.
2—Bucket elevators, cap. 47 tons per hr., 65 ft. centers; buckets on chain.
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1—No. 5½ Symons coarse cone crusher, Shop No. 521, belt driv., right hand dr.

CRANES (Locomotive)

1—American 25-ton cap., type No. 258, 8-wheel steam driven locomotive crane, with 50 ft. boom, steam brakes, outriggers, and 1 kw. turbine generator set.

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10—American steel guy derricks, 15-ton cap., 115 ft. mast, 100 ft. boom.
1—American steel stiff-leg derrick, 10-ton cap., 40 ft. mast, 80 ft. boom.
2—Wooden guy derricks: 1—80 ft. mast, 76 ft. bm.; 1—71 ft. mast, 70 ft. bm.
2—Stiff-Leg Derricks, 39 ft. mast, 65 ft. boom.

ENGINE (Steam)

1—Harrisburg heavy duty, size 17x20 in., 225 hp.

CEMENT GUN

1—Cement Gun N-1, tank and hose.

GROUT MACHINE

1—Cockburn Barrow Grout Machine, cap. 600 bags per hour.

HAMMERS

2—McKiernan-Terry Steam Hammers: 1—No. 6; 1—No. 2.

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4—Lidgerwood Steam, 8¼x10 D.D. D.C. hoist, with Dake swinger, with boiler.
1—American 8¼x10 D.D. D.C., with Mead-Morrison swing, eng., with boiler.
7—Chain Hoists: 1—10-ton chain fall; 3—Reading 5-ton cap. Hoists; 1—Yale 5-ton chain fall; 1—4-ton cap. chain fall; 1—Reading 2½-ton cap.
1—Sullivan Turbinair single drum, Class HA-3.

JACKS

39—Jacks: 2—35-ton Norton Jacks; 1—35-ton No. 68 Duff; 8—15-ton Style No. C-F Duff Norton; 28—No. 110 Barrett Jacks.

LOCOMOTIVES

1—American Saddle Tank, 24-ton cap., 36-in. Ga.
10—Vulcan gasoline locomotives, 8-ton cap., Class C.W.—Std. Ga.

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1—Crescent No. 124 Planer. 1—Southwark No. 3 S.E. vert. punch.

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1—Good Roads Mod. No. 25, with 36 in. x10 ft. mouldboard.

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12—Sullivan Mod. L8 Rock Drills.
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PUMPS (Centrifugal and Electric)

20—Centrifugal Pumps, complete with electric motors, 440 v., 60 cycle, 3 phase.
2—Lawrence, 10 in., 3000 G.P.M. cap.; 5—Lawrence 8 in., 1800 G.P.M. cap.; 1—Lawrence, 8x6 in., 1200 G.P.M. cap.; 3—Lawrence 6 in., 1200 G.P.M. cap.; 1—Lawrence, 6 in., 1000 G.P.M. cap.; 4—Lawrence 8x4 in., 250 G.P.M.; 1—Cameron, 2-stage, belt driven 1200 G.P.M. at 347 ft. head; 3—Morris, 2-stage, direct connected, 100 hp., 440 v. motor, 750 G.P.M. at 125 lb. pressure.
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PUMPS (Diaphragm and Piston Gasoline)

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4—Piston pumps, gasoline driven: 2—6x6-in. Goulds; 2—3x5-in. Goulds, piston pumps.
1—8x12-in. horizontal piston pump, steam power.
1—Ingersoll-Rand contractors' sinker pump, size 6x4x6x7.
1—5-gal. shotwell gasoline hand pump.
1—Pulsometer pump No. 7, complete.
1—Blake duplex, 5¼x3½x5 steam pump.

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1—American 36-in. band saw, 220 v. motor.
1—Crescent 36-in. band saw.
1—Bentel & Margedant No. 334 double bench saw, cap. 18-in. saw, tilting table.
1—Economy No. 40 power hack saw, cap. 17-in. blade.
1—Marvel No. 2 hack saw, belt driven.

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1—3x9 ft. shaker feeder.
2—"Deep" groove feeders, type R.L.

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2—Osgood 1½ cu.yd. cap., Shop No. 1576-1575; also 45 ft. crane boom.
1—Marion Model No. 36, 1½ cu.yd. cap., Shop No. 3941; traction wheels.
1—Bucyrus-Erie, 30-B, 1¼-cu.yd. cap., Shop No. 3910, complete with crane boom.
1—Marion Mod. 32, 1¼ cu.yd. cap. Shop No. 5289, crane boom.
1—Osgood Mod. No. 29, 1 cu.yd. cap., Shop No. 1198.
1—Marion Mod. 31, ¾ cu.yd. cap., Shop No. 2851; traction wheels.
1—Osgood, ¾ cu.yd. cap., Shop No. 1307.

SILOS

2—Bulk cement silos, 2500 barrels cap.

MISCELLANEOUS TOOLS

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3 miles portable track, 24" gauge, also
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ANY SIZE ANY SHAPE

Antifriction Belt Conveyor Idlers
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2—6-in. gravel pumping outfits complete. One stone box.
1—¾-yd. slack line gravel dipper.
1—½-yd. slack line gravel dipping outfit, mounted on truck.
1—½-yd. drag scraper outfit.
1—8x12 Champion stone crusher like new.
For detailed information call or write.

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Osgood 1-yard gas crawler shovel, overhauled.
Locomotives: 75-ton switcher code boiler; also saddle tank type, narrow and standard gauge.
CARS: side dump 12-yard; 50-ton steel twin hopper cars, etc.
Large stock Railroad and Contractors equipment.

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Atlanta, Ga.

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1—Haiss 1-yd. "Contractor" Bucket.
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1—Haiss ¾-yd. "Hi-Power" Bucket.

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1—Allis-Chal. 36"x16" Roller Stone Crusher.
1—Wms. No. 6 Jumbo Hammer Crusher.
1—Wms. No. 6 Pat. Regular Hammer Crusher.
2—Penna. Size S-7 Hammer Crushers.
1—Thew 1½ yd. 4 wheel Elec. Shovel, 1 yd. dipper.
3—50-ton 6 wh. Baldwin S. G. Switching Locos.

IRON & STEEL PRODUCTS, INC.
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Robins 24" trough 80' belt conveyor.
Robins 18" trough 100' belt conveyor.
Robins 16" trough 50' belt conveyor.
Robins 16" trough portable 25' belt conveyor.
Inslee Backhoe, late type "C," with steel cab.
Acme stone crusher, with 11"x22" jaw.
Jeffrey Limepulver No. 3, two tons per hour.
Stone screen on rollers, 42"x18'.
Koppel four yard dump cars, 36" gauge.
Brookville-Fordson 3-ton locomotive, 36" gauge.

G. A. UNVERZAGT, 15 Park Row, New York City

Bargain Days Are Here Again

Crushers 56x72 Buchanan jaw Texrope drive
Conveyors 36x244—36x279—24x140—24x256
Screens 4 single deck Gyrex 4 dirt & scalping
Crushers 2 each Telsmith 20A and 10A Texrope drive
Storage Bins 564 yd. 3 unit—motors AC—125-250 hp.
Pumps centrifugal motor driven 500 gals. 283 ft. head

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2—3-ton U. S. LIBERTY TRUCKS, dump bodies, hydraulic hoists, spare set tires, ready to drive out...$450 each. 5-ton MACK TRUCK PARTS, dismantling 3, 1917 models, will sell any parts cheap.

O. C. EVANS
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Wanted

1—3 phase, 60 cycle, 220 volt, low voltage Engine Type Generator—Suitable for direct connection for Fairbanks-Morse 120-hp. Y type Diesel—with switchboard, less voltage regulator, with ammeters and volt meters.

HEUMADER QUARRIES,
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WANTED

Used 24" antifriction or roller bearing belt conveyor, 120 ft. long. State condition and price.

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1074 Gratiot Ave. Saginaw, Mich.

WANTED

One steam crane forty-five foot boom to handle ¾-yard sand clam.

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Wanted—Jaw Crusher

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538 S. Clark St., Chicago

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1—Marion 37 electric shovel, 2 yd. capacity.

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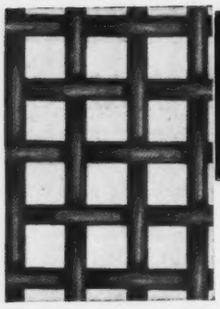

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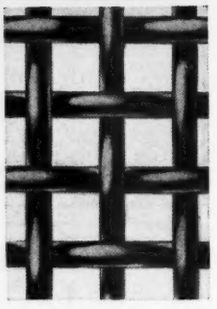

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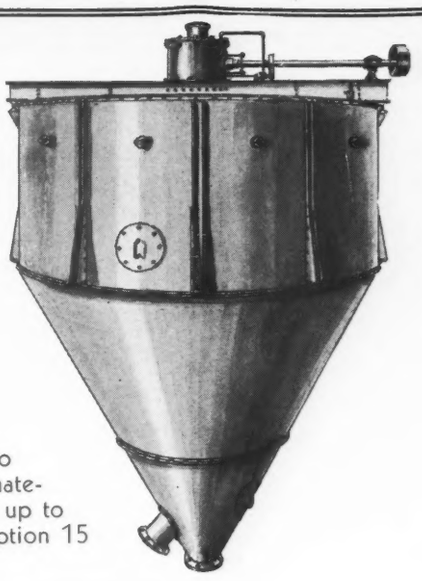

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